NHS

PANDEMIC FLU

UK HEALTH DEPARTMENTS

UK INFLUENZA PANDEMIC CONTINGENCY PLAN

OCTOBER 2005

Reader information

Policy	Estates
HR/Workforce	Performance
Management	IM&T
Planning	Finance
Clinical	Partnership Working
Document Purpose	For Information
ROCR Ref:	**Gateway Ref:** 4615
Title	UK Health Departments' Influenza pandemic contingency plan
Author	DH/HPIH&SD/Immunisation Policy, Monitoring & Surveillance
Publication Date	20 Oct 2005
Target Audience	PCT CEs, NHS Trusts CEs, SHA CEs, Care Trust CEs, Foundation Trust CEs, Medical Directors, Directors of PH, Directors of Nursing, PCT PEC Chairs, NHS Trust Board Chairs, Special HA CEs, Allied Health Professionals, GPs, Communications Leads, Emergency Care Leads.
Circulation List	Voluntary Organisations
Description	This document outlines the UK's plan for responding to an influenza pandemic. It is based on the framework recommended by the World Health Organization for national pandemic plans.
Cross Ref	Flu key documents – www.dh.gov.uk/pandemicflu
Superseded Docs	1997 Multiphase contingency plan for pandemic influenza UK Influenza Pandemic Contingency Plan March 2005
Action required	N/A
Timing	N/A
Contact Details	Dr Jane Leese Senior Medical Officer Immunisation and Communicable Disease Team Department of Health Area 507, Wellington House 133-155 Waterloo Road London SE1 8UG www.dh.gov.uk

For Recipient's Use

CONTENTS

ANNEXES

Executive summary

Pandemics of influenza have swept the world from time to time throughout history, three times in the last century. They caused widespread illness, large numbers of deaths, including among children and young adults, and huge societal disruption, concentrated in just a few weeks. There is currently rising concern that a new influenza virus with pandemic potential will emerge and spread, and a further pandemic can be expected. When that will be is not known, but the consequences, when it does, will be serious. Around a quarter of the population could be affected, with over 50,000 deaths in the UK alone. This could be over one or more waves, each lasting around 3 months.

This document updates the March 2005 UK Influenza Pandemic Contingency Plan. It sets the scene and provides the overall framework for the UK's response to an influenza pandemic. It is based on current advice from the World Health Organization for national pandemic plans. The response is divided into phases, starting with work to be done before a pandemic or potential pandemic emerges, followed by a step-wise escalating response as a pandemic evolves.

The prime objectives are to save lives, reduce the health impact of a pandemic and minimise disruption to health and other essential services, while maintaining business continuity as far as is possible and reducing the general disruption to society that is likely to ensue, serious though this will be.

Strong leadership, organisation and co-ordination and clear lines of accountability and communication will be key to preparing for, and responding to a pandemic. The Department of Health (England) is the lead Government Department, supported by the Health Protection Agency. The Department of Health will:

- co-ordinate the UK health response
- procure appropriate antiviral drugs and develop strategies for their optimal use
- facilitate the development, manufacture and supply of an effective vaccine and develop strategies for its use
- lead work with the devolved administrations to secure consistent public health and health service responses across the UK
- lead the public health and health service responses in England (the devolved administration Health Departments will undertake this role in their countries)

- provide information and input to other Government Departments and other services and organisations to assist them in their response arrangements, particularly those implementing control measures and for maintaining essential services

- provide information for the media and public in co-ordination with the Government News Co-ordination Centre.

The Health Departments will be advised by a UK National Pandemic Influenza Committee and a Scientific Advisory Group.

Once the pandemic is confirmed, cross-Government co-ordination and liaison with the Devolved Administrations for the civil emergency response will be provided through the Civil Contingencies Committee.

The roles and responsibilities of the key organisations at UK national, devolved administration, regional and local levels are described. These organisations need to develop and maintain their own plans, covering their part of the response, consistent with both the UK plan and their own plans for other relevant emergencies. Further guidance for NHS organisations, and a check list for other organisations, have been developed and are available at www.dh.gov.uk/pandemicflu

Two key medical interventions may help to reduce the health impact: immunisation, and the use of antiviral drugs active against influenza. Both vaccine and drugs will need to be used in the most effective way, according to their availability using/following nationally agreed principles and protocols.

As a pandemic influenza virus will be significantly different from recently circulating strains, a new vaccine will need to be developed against the new strain and this can only be done once it is known. Preparatory work will be undertaken which should facilitate development of a suitable vaccine when the need arises, but even routine influenza vaccines take several months to manufacture, and there may be additional technical difficulties in the development of a pandemic vaccine because of the particular properties of the virus. This means that it will take time before vaccine can be produced on a large scale and it may not be available at all for the first wave of a pandemic. Plans must cover these contingencies. Clear, transparent policies are described for prioritising vaccine use as and when it becomes available.

In the meantime, antiviral drugs will be used to gain maximum benefit according to their availability. The Department of Health, in liaison with Health Departments in the Devolved Administrations, is building up a stockpile of suitable antiviral drugs and developing strategies for their optimal use. Assessment of their effectiveness in use will be important during all phases of the response to further inform these strategies.

With or without medical interventions such as vaccines and antiviral drugs, other public health or social interventions may help to limit or slow the spread of the disease. Measures such as hand washing, voluntary isolation of cases, effective handling of contacts and limiting non-essential travel and mass gatherings of people may 'buy' valuable time, particularly in the early phases. Real time modelling and any new evidence will be used to assess whether such measures should be used.

Communications are a crucial element of the response. Many groups, not least the public, will need clear, accurate information and advice about the actions they can take. They will also need assurance that their concerns are being addressed.

A pandemic is, by definition, an international event. The UK has certain international obligations in communicable disease control, to the World Health Organization and the European Union. The UK also expects to play a full part in supporting these organisations in their efforts to control an influenza pandemic.

Preparedness planning is an ongoing activity and this plan will be reviewed and updated at least annually. Comments are invited to feed into this review.

Abbreviations

A&E	Accident and Emergency
ABPI	Association of British Pharmaceutical Industry
ABTA	Association of British Travel Agents
ACDP	Advisory Committee on Dangerous Pathogens
BIS	British Infection Society
BTS	British Thoracic Society
CCC	Civil Contingencies Committee
CDSCNI	Communicable Disease Surveillance Centre, Northern Ireland
CCDC	Consultant in Communicable Disease Control
CCS	Civil Contingencies Secretariat
CDC	(USA) Centers for Disease Control
CE/CEO	Chief Executive/Chief Executive Officer
CEPR	(HPA) Centre for Emergency Preparedness and Response
CfI	(HPA) Centre for Infections, Colindale
COBR	Cabinet Office Briefing Room
COSHH	Control of Substances Hazardous to Health (Regulations)
CSM	Committee for Safety of Medicines
DA	Devolved Administration
DEFRA	Department for Environment, Food and Rural Affairs
DH	Department of Health
DPH	Director of Public Health
ECDC	European Centre for Disease Prevention and Control
EISS	European Influenza Surveillance Scheme
EU	European Union
European Network	European Network for the Epidemiological Surveillance and Control of Communicable Diseases
EWRS	Early Warning and Response System (of the European Network)
FCO	Foreign and Commonwealth Office
GCN	Government Communications Network
GP	General Practitioner
HEPA	High Efficiency Particulate Arrestance (filter), or Health Emergency Planning Adviser
HEPO	Health Emergency Planning Officer
HPA	Health Protection Agency
HPU	Health Protection Unit
HPS	Health Protection Scotland
HSE	Health and Safety Executive
ICT	Infection Control Team
ILI	Influenza-like illness
ITU	Intensive Therapy Unit
JCVI	Joint Committee on Vaccination and Immunisation
JHAC	Joint Health Advisory Cell

LA	Local Authority
LaRS	(HPA) Local and Regional Services
LHB	Local Health Board
LHI	Laboratory for Hospital Infection
MHRA	Medicines and Healthcare Products Regulatory Agency
MRC	Medical Research Council
NaTHNaC	National Travel Health Network and Centre
NBS	National Blood Service
NAW	National Assembly for Wales
NCC	(Government) News Co-ordination Centre
NCL	National Collaborating Laboratories
NEPNEI	National Expert Panel on New and Emerging Infections
NHS	National Health Service
NIBSC	National Institute for Biological Standards and Control
NIMR	National Institute for Medical Research
NIPC	National Influenza Pandemic Committee
NIRL	National Influenza Reference Laboratory
NPHS	National Public Health Service (Wales)
OIE	Office International Epizootic
PASA	(NHS) Purchasing and Supply Agency
PCR	Polymerase Chain Reaction
PCT	Primary Care Trust
PPE	Personal Protection Equipment
QA	Quality Assurance
Ro	Basic Reproduction Number
RCGP	Royal College of General Practitioners
RCN	Royal College of Nursing
RCP	Royal College of Physicians
RCPath	Royal College of Pathologists
RCPCH	Royal College of Paediatrics and Child Health
RDPH	Regional Director of Public Health
SAG	Scientific Advisory Group
SARS	Severe Acute Respiratory Syndrome
SHA or StHA	Strategic Health Authority
SITREP	Situation Report
SOP	Standard Operating Procedure
TIDO(PRP)	Official level Government committee dealing with International and Domestic Terrorism and broader civil hazards – (Preparedness)
UK	United Kingdom
UKNIPC	United Kingdom National Influenza Pandemic Committee
UVIG	United Kingdom Vaccine Industry Group
VLA	Veterinary Laboratories Agency
WHO	World Health Organization

1. Introduction

"Most experts believe that it is not a question of whether there will be another severe influenza pandemic, but when."
(The Government's Chief Medical Officer, 2002)[1]

The widespread occurrence – and continued spread – of a highly pathogenic avian (bird) influenza virus (H5N1) in poultry in SE Asia since 2003 has increased concern that this could provide the seedbed for the emergence of a new human influenza virus with pandemic potential. While international efforts are being directed at preventing such an event, or aborting it early in its tracks, the opportunities to do this are limited and once established, the virus will spread rapidly. The tools to reduce its spread and impact are also limited, and will have to be used to best effect. The UK Government gives high priority to improving our preparedness to manage an influenza pandemic. This document which updates the March 2005 Contingency Plan, sets out the overall UK response. It concentrates on the central Government and health responses, but provides the information and framework for the planning which must take place across all sectors of society.

A **pandemic** is the worldwide spread of a disease, with outbreaks or epidemics occurring in many countries and in most regions of the world. **Influenza** (flu) pandemics have swept the globe from time to time throughout history with devastating effect, far in excess of that resulting from the 'seasonal' influenza which (in the UK) occurs most winters. Three pandemics occurred in the last century – in 1918/19 ('Spanish' flu), 1957/58 ('Asian' flu) and 1968/69 ('Hong Kong' flu). Up to a quarter of the UK population developed illness in each of these pandemics, many thousands of people died and the associated economic and social disruption was huge. The most severe – that of 1918/19 – is estimated to have killed around 250,000 people in the UK and between 20 and 40 million people worldwide, a greater toll than the whole of the First World War.

A pandemic of influenza results when a new influenza virus emerges which is markedly different from recently circulating strains and is able to:

- infect people (rather than, or in addition to, other mammals or birds)
- spread readily from person to person
- cause illness in a high proportion of the people infected, and

[1] Getting Ahead of the Curve – a strategy for combating infectious diseases. A report by the Chief Medical Officer, Department of Health 2002

- spread widely, because most people will have little or no immunity to the new virus and will be susceptible to infection (they will not previously have been exposed to it or a similar strain of virus, and any previous vaccinations will not have covered the strain).

The conditions in which a new virus might emerge and spread continue to exist and thus further pandemics of influenza are expected. In particular, the widespread occurrence of a highly pathogenic avian (bird) influenza virus (H5N1) in poultry in SE Asia since 2003, which has also infected some people, is thought to provide a seedbed for the possible emergence of a new virus with greater affinity for people and thus the potential to cause a new pandemic. The timing, extent and severity of a future pandemic remain uncertain, but experience from previous pandemics is that it will spread rapidly to all parts of the globe causing sudden, sharp increases in illness and deaths over a matter of weeks. It could rapidly overwhelm health and other services, and have far reaching effects on daily life, businesses and consequently national and global economies.

Advance planning is essential, to establish – and rehearse – contingency arrangements, and identify and address gaps in our preparedness, so that we are in the best possible position to manage an emergency on such a scale and ameliorate its impact. Disruption is likely to be less if people know what to expect and what to do and have had time to think through the consequences for themselves, their families, communities and organisations.

This Plan builds on previous experience of managing events such as SARS in 2003 and takes into account 2005 WHO guidance including new phases. It recognises the importance, when responding to a new event, of basing plans on existing systems and infrastructures with which people are familiar, such as the current national infrastructure for the prevention and control of seasonal influenza, and plans and organisational arrangements for other outbreaks and emergencies.

Not least among the uncertainties of a flu pandemic will be our ability to reduce its impact through medical countermeasures such as vaccination and the use of antiviral drugs. The normal annual influenza vaccine will not protect against a pandemic strain, and a specific vaccine will need to be developed and manufactured. This takes time, and may meet technical and other delays, despite preparatory work in the inter-pandemic period to try to identify and address potential problems in advance. The UK Government is building up a stockpile of antiviral drugs to treat the anticipated number of people with influenza during a pandemic based on WHO advice about the likely attack rate, but it will not be known until the time how effective they will be.

An influenza pandemic, or the threat of one, will create a high demand for information and advice, from health professionals, businesses and organisations, the general public and the media, about the threat and the responses to it. Rapid and effective communications, making difficult policy decisions transparent and managing people's concerns, are an integral part of the Plan.

This plan concentrates on the central response, but it also provides the framework and information for all organisations involved in preparing for and responding to an influenza pandemic, in order to provide a coherent approach with each part knowing its role in relation to others. It identifies actions to be taken at each phase of the pandemic as defined by WHO, with clear modifications to adapt the WHO phases to the UK situation.

The plan is also intended to be flexible so that our response can be adapted as a pandemic evolves and knowledge about the new virus, its impact and the effectiveness of available countermeasures emerges.

Improving our preparedness is a continuous activity and this plan will continue to be reviewed and updated, in particular to take account of new advice relevant to national plans from the World Health Organization.

2. Aim and objectives

This document aims to provide a national framework for an integrated UK-wide response to an influenza pandemic, with clear guidance for those developing more detailed operational plans for their own part of the response at all levels. The response is based on phases, defined by the World Health Organization (WHO) in 2005, which trigger escalating public health action, starting with plans which need to be put in place, and tested, during the inter-pandemic and pandemic alert period.

An inter-agency response is indicated and the roles of relevant organisations and their lines of communication are defined.

2.1 Objectives

More specific objectives of contingency planning for an influenza pandemic are to:

- set up a system for a flexible response to unpredictable events
- prevent the emergence of a potentially pandemic virus, to the extent that this is possible
- recognise a novel strain of influenza virus with pandemic potential, and clinical illness due to it
- minimise the spread of the new virus, and if possible prevent a pandemic developing
- rapidly assess the emerging epidemiology of a new pandemic, eg the age groups predominantly affected, to inform control measures
- limit morbidity and mortality due to infection with the pandemic strain
- provide treatment and care for large numbers of people ill from influenza and its complications
- cope with the eventuality of large numbers of people dying
- reduce the impact on health and social services consequent to an influenza pandemic, including any consequences for other patients as a result of re-prioritisation of services or cancellation of routine work

- provide timely, authoritative and up to date information for professionals, the public and the media throughout the period of a potential or actual pandemic
- ensure that essential services are maintained
- reduce the impact on daily life and business
- anticipate and plan for other consequences
- minimise economic loss.

Even if all these objectives are achieved, the consequences of an influenza pandemic are likely to be serious.

2.2 Principles underlying the response

The following principles underly this contingency plan:

- The priority in an influenza pandemic is to reduce the impact on public health (ie reduce illness and save lives). Interventions will therefore be applied where they will achieve maximum health benefit. However, they may also be needed to help maintain essential services. Should there be a conflict between these two aims, political decisions will need to be made about priorities for the use of interventions.
- With or without medical interventions to protect or treat large numbers of the population, measures aimed at slowing the spread of a pandemic may buy valuable time, and help services to cope, even if this prolongs the overall duration of the pandemic.
- The response to pandemic influenza in the UK will require collaboration between central Government, Devolved Administrations, the Health Protection Agency, Health Protection Scotland, Wales National Public Health Service and NHS infrastructures at all levels together with many partner organisations and the public.

3. The phases of an influenza pandemic

The World Health Organization has defined phases in the evolution of an influenza pandemic which allow a step-wise escalating approach to preparedness planning and response leading up to declaration of the onset of a pandemic. Once a pandemic has been declared, UK action will depend on whether cases have been identified in the UK, and how extensively it has spread. For UK purposes, therefore, additional UK alert levels are included within the WHO pandemic phase (Phase 6).

3.1 International phases

The World Health Organization (WHO) phases, which were revised in April 2005, describe the progression of an influenza pandemic from the first emergence of a novel influenza virus, to wide international spread. This is a global classification based on the overall international situation and is now used internationally for planning purposes.

Inter-pandemic period

Phase 1 No new influenza virus subtypes have been detected in humans. An influenza virus subtype that has caused human infection may be present in animals. If present in animals, the risk of human infection or disease is considered to be low.

Phase 2 No new influenza virus subtypes have been detected in humans. However, a circulating animal influenza virus subtype poses a substantial risk of human disease.

Pandemic Alert Period

Phase 3 Human infection(s) with a new subtype, but no new human-to-human spread, or at most rare instances of spread to a close contact.

Phase 4 Small cluster(s) with limited human-to-human transmission but spread is highly localised, suggesting that the virus is not well adapted to humans

Phase 5 Large cluster(s) but human-to-human spread still localised, suggesting that the virus is becoming increasingly better adapted to humans, but may not yet be fully transmissible (substantial pandemic risk).

Pandemic period

Phase 6 Pandemic phase: increased and sustained transmission in the general population

Past experience suggests that a second, and possibly further, waves of illness caused by the new virus are likely 3-9 months after the first wave has subsided. The second wave may be as, or more, intense than the first

Post Pandemic Period

Return to inter-pandemic period

3.2 Transition between phases

Transition between phases may be rapid and the distinction blurred. The crucial interval is between WHO Phases 5 and 6, which will determine to a large extent whether vaccine can be developed in time for the first wave of illness in the UK.

3.3 Implications for the UK

The WHO Plan recognises additional national subdivisions for Phase 2 onwards according to whether a country is affected itself, has extensive travel/trade links with an affected country, or is not affected.

For UK purposes, should the UK have cases during the pre-pandemic period, the international phases apply. Once a pandemic has been declared (Phase 6), a four point UK-specific alert mechanism has been developed (see below) which is consistent with the alert levels used in other UK infectious disease response plans:

Alert level 1 Cases only outside the UK (in a country or countries with or without extensive UK travel/trade links)

Alert level 2 New virus isolated in the UK

Alert level 3 Outbreak(s) in the UK

Alert level 4 Widespread activity across the UK

A move to a higher alert level may be triggered, after assessing the risk, if influenza due to a pandemic strain is affecting another country geographically close to the UK, although technically it is still ‘outside the UK’.

Table 1 International Phases and their significance for the UK

	International phases	Significance for UK
	Inter-pandemic Period	
1	No new influenza virus subtypes detected in humans	UK not affected UK has strong travel/trade connections with affected country UK affected
2	Animal influenza virus subtype poses substantial risk	
	Pandemic Alert Period	
3	Human infection(s) with a new subtype, but no new human to human spread to a close contact	UK not affected
4	Small cluster(s) with limited human-to human transmission but spread is highly localised, suggesting that the virus is not well adapted to humans	UK has strong travel/trade connections with affected country
5	Large cluster(s) but human-to-human spread still localised, suggesting that the virus is becoming increasingly better adapted to humans	UK affected
	Pandemic Period	
6	Increased and sustained transmission in general population	**UK Alert level** **1** Virus/cases only outside the UK **2** Virus isolated in the UK **3** Outbreak(s) in the UK **4** Widespread activity across the UK
	Post Pandemic Period	
	End of pandemic Return to inter-pandemic period	

3.4 Mechanism for declaring a pandemic

The WHO will announce the various phases as soon as they are confirmed, indicating the level of preparedness expected of WHO and its individual Member States.

National Authorities are expected to be prepared to activate their national contingency plans following announcement of WHO Phase 5 (the highest pandemic alert level). Before announcing this phase, WHO will have consulted international experts to rule out other possible explanations, such as subversive activity.

WHO will normally consult internationally before confirming Phase 6, ie the onset of a pandemic.

Action in the UK

On being informed by WHO of the isolation of a new influenza virus with pandemic potential (normally when person to person spread has been confirmed, ie **Phase 5**), the Secretary of State for Health, on the advice of the Chief Medical Officer, England, will convene the UK National Influenza Pandemic Committee (UKNIPC, Annex A) which advises all four UK Health Departments. The Department of Health (England) will inform the Devolved Administrations (DAs) and the Civil Contingencies Secretariat (CCS). The CCS will inform other Government Departments. The Civil Contingencies Committee (CCC) is likely to meet to review preparedness across all sectors and take appropriate strategic decisions. A CCC subgroup may be established at this stage. The Health Departments will advise the NHS in their relevant countries.

On receipt of confirmation from WHO of the onset of a likely pandemic, ie **Phase 6**, the Department of Health will immediately cascade this information to the Devolved Administrations, HPA, the CCS, other Government Departments and Agencies, the NHS in England and other relevant services and agencies. The DAs will inform the NHS in their countries. The CCC will be convened at this stage, if not already convened at Phase 5, and similar committees will be convened in the DAs, as appropriate.

In exceptional circumstances, the UK may **convene the UKNIPC** on the strength of advice from the HPA or the National Expert Panel on New and Emerging Infections (NEPNEI), in the absence of, or where this differs from, advice from WHO, on the grounds of UK national interest. The UK may also **implement its pandemic plans** in the absence of a WHO declaration, on the advice of the UKNIPC, and after consultation with other European Member States through the European Communicable Diseases Network.

Should a potential pandemic subsequently fail to evolve, the UKNIPC will be stood down and other bodies informed as described above.

4. Setting the scene: the origins and likely impact of an influenza pandemic

An influenza pandemic is thought most likely to emerge from SE Asia, but could start anywhere in the world. For planning purposes, working estimates of the most likely subsequent spread and impact have been derived from theoretical modelling, informed by past experience, knowledge of the world today and expert advice. Once established, a pandemic is likely to spread to the UK in less than a month. In a further 2-3 weeks, it could have spread across the UK. Thereafter, activity could last 3-5 months, with a peak of cases at about week 6. Subsequent waves are likely, weeks to months later. The illness is likely to affect more people and cause more severe illness than the annual 'seasonal' influenza which occurs each winter in the UK: about a quarter of the population may have developed the illness, with 50,000 deaths or more, by the end of the pandemic. Estimates for the demand on health care are provided. Timely information about an actual pandemic, once it emerges, will be essential to provide more accurate predictions.

4.1 Seasonal influenza

Influenza is an acute viral infection characterised by the sudden onset of fever, chills, headache, muscle pains, severe prostration and usually cough, with or without a sore throat or other respiratory symptoms. The acute symptoms last for about a week, although full recovery may take longer. In most years, influenza occurs predominantly during a six to eight week period during the winter. For most people, this 'seasonal' influenza is an unpleasant but self-limiting and not life-endangering illness, but in some people it may be more severe, or complicated by secondary bacterial infections such as bronchitis and pneumonia. The very young, the elderly and people with underlying diseases such as heart or chest disease are particularly at risk of serious illness from influenza. Without interventions such as annual influenza immunisation, the elderly and those of all ages in disease-based risk groups suffer significant morbidity and mortality even in a non-pandemic year. An estimated 12,000, mainly elderly, people die each year from seasonal influenza in England and Wales. Further information on influenza viruses and the illness they cause is at Annex B.

4.2 Pandemic influenza

In past pandemics, the scale and severity of illness, and hence the consequences, have varied considerably but in general they have been of much greater magnitude than even the most severe 'epidemic' winters. There have also been material differences in the age groups most affected (for example, working age adults rather than the elderly), the time of year of outbreaks and the speed of spread, all of which influence the overall impact.

Despite their variability and unpredictability, much can be learned from previous pandemics (Annex C). But much has also changed since the last pandemic in 1968, including:

- the demography of the population (a greater proportion of elderly people)
- health care opportunities and expectations
- the greater emergence of antimicrobial resistance among the bacteria which may cause infections such as pneumonia following influenza, and
- the extent of 'surge' capacity in health care systems.

Mathematical modelling provides an adjunct to previous experience to help inform both strategic and operational planning for a future pandemic. The models enable current circumstances and the likely impact and effectiveness of interventions to be factored into plans. However, modelling can only be as good as the data fed into the models and the assumptions made in the design of the models. In the case of a new pandemic influenza virus there are few data and a wide range in the plausible assumptions that can be made. The main role of modelling in advance of a pandemic is to map out the range of possible risks and to investigate which responses are robust over the range of uncertainty.

Further information on the modelling being undertaken in the UK is given in Annex D.

4.3 Planning assumptions

This plan is based on assumptions derived from known evidence, expert opinion and the modelling work described above. As has been emphasised many of the important features about a future pandemic influenza virus and how it spreads are uncertain. Plans will need to be constructed which deal with a wide range of possibilities. To simplify presentation this document concentrates on a 'most likely' base scenario following WHO advice – but the possible ranges are also considered.

These are working estimates for planning purposes, and not predictions of the next pandemic. It is anticipated that real time modelling based on emerging surveillance information will be used to inform plans during the evolution of a pandemic.

Origins of a pandemic

- A new pandemic will be due to a new subtype of influenza A.
- Emergence of new influenza A viruses is inevitable.
- A new virus may be a re-emerging previously known human virus subtype which has not recently been in circulation, or a virus of avian origin, emerging either through stepwise 'adaptation' conferring greater affinity for people or through a process of genetic 'reassortment' between the genes of an avian and a human virus.[2]
- From time to time, avian influenza viruses will infect people directly exposed to infected poultry, as occurred in Hong Kong in 1997, Holland in 2003 and China and the Far East since 2004, but they will not necessarily evolve into pandemic viruses.
- A new strain is likely to transmit more easily to people if it contains genetic material from a human influenza virus.
- A potentially pandemic or pandemic strain could first emerge anywhere, including in the UK, but is most likely to emerge in China or the Far East – the birthplace of recent pandemics. The close proximity of humans, ducks, other poultry and domestic pigs in farming communities in South East Asia and China:
  - facilitates mingling of human and animal viruses which may then exchange genetic material, resulting in a new 'reassorted' strain
  - means viruses may directly transfer from birds (or animals) to humans and then adapt to become 'fitter' for infecting people
  - In the case of H5N1 there is already wide dissemination in poultry, domestic fowl and wild birds.

[2] There are 16 haemagglutinins (HAs) which exist in nature all of which can infect birds. So far, H1, H2 and H3 have been associated with widespread human disease and it is known that at least H5, H7 and H9 have the potential to cause human disease, that from H5N1 being particularly severe. Aquatic birds (possibly ducks) harbour avian influenza viruses that have only rarely or never previously infected humans.

- Viruses may also re-emerge from unrecognised or unsuspected reservoirs.
- Whenever such a virus, or other novel influenza virus, is isolated from a human infection, its potential to spread directly from person to person and cause outbreaks of illness needs to be assessed.
- False alarms are likely, but until it is known whether or not a new virus has resulted in person to person transmission, its pandemic potential must remain under consideration (and investigations will inevitably consume resources).

Timing

- A future influenza pandemic could occur at any time (intervals between the most recent pandemics have varied from about 10 to 40 years with no recognisable pattern, the last being in 1968/9).
- A new virus may not follow the usual seasonal pattern of influenza, and may occur at any time of year (seasonal variation is in any case less distinct in the tropics).

Geographical spread

- In the event of a novel influenza virus causing significant outbreaks of human illness elsewhere in the world, it is unlikely that the UK could prevent importation (except by closing all borders); even a 99.9% restriction of travel into the country would only be expected to delay importation of the virus by up to two months.
- Spread from an origin in Asia is likely to follow the main routes of travel and trade. Greater travel within mainland China and between mainland China and Hong Kong may facilitate the early spread of a virus emerging from that area.
- Increasing use of routes out of China such as through Cambodia and Vietnam, where surveillance is not well developed, may result in the failure to document the early stages of its spread.
- Spread from the source country to the UK, through the movement of people, is likely to take around a month and experience of the dissemination of SARS from Hong Kong suggests modern travel may result in wide international spread even more rapidly than this.
- Following arrival in the UK it will take a further 2-3 weeks until cases are occurring across the whole country.

Duration

- Once influenza levels exceed our baseline threshold of 30 new GP consultations per 100,000 population per week, influenza activity in the UK may last for 3-5 months, depending on the season, and there may be subsequent waves, weeks or months apart.

Infectivity and mode of spread

- Influenza is mainly spread by the respiratory route, through droplets of infected respiratory secretions produced when an infected person talks, coughs or sneezes; it may also be spread by hand/face contact after touching a person or surface contaminated with infectious respiratory droplets. Finer respiratory aerosols (which stay in the air for longer and are therefore more effective at spreading infection) may occur in some circumstances.
- People are highly infectious from the onset of symptoms for 4-5 days (longer in children and people who are immunocompromised). People are likely to be infectious just before the onset of symptoms. Children have been shown to shed virus for longer (and at higher levels) than adults.
- People with asymptomatic infection shed virus and are therefore also likely to be infectious to some extent and pass the infection on.
- The incubation period is 1-3 days
- Without intervention, and with no significant immunity in the population, the historical evidence suggests one person infects on average about 1.4 to 1.8 people (the Ro or 'basic reproduction number'). This number is likely to be higher in closed communities.

The extent and severity of illness

- Important differences in the extent, age distribution and severity of illness are likely compared with annual seasonal influenza, but will not be known until human-to-human transmission is under way.
- Most people will be susceptible, although not all will necessarily develop clinical illness. Previous experience suggests that roughly equal numbers will have asymptomatic as have symptomatic infection.
- For planning purposes the base scenario, based on previous pandemics in the 20th century, is a cumulative clinical attack rate of 25% of the

population over one or more waves of around 15 weeks each, weeks or months apart. This compares with a usual seasonal influenza attack rate of 5-10%. The second wave may be the more severe.

- In the tables that follow, 10% and 50% clinical attack rates have also been considered. Where no range is given, the base 25% clinical attack rate over a single wave is assumed. The total cumulative attack rate over a number of waves is unlikely to exceed 50%. A reasonable worst case single wave would therefore be represented by figures double those presented for a 25% attack rate.

- All ages will be affected, but children and otherwise fit adults could be at relatively greater risk, particularly should elderly people have some residual immunity from exposure to a similar virus earlier in their lifetime. For illustrative purposes, a uniform attack rate has been used across all age groups.

- The age-specific differential attack rate will affect the overall impact: if working age adults are predominantly affected this will impact more seriously on provision of services and business continuity, while illness in the very young and the elderly is likely to present a greater burden on health services, especially, for the former, paediatric intensive care.

- More severe illness than the usual seasonal influenza is likely in all population groups rather than predominantly in high risk groups, with a higher number of people than usual developing severe prostration and rapidly fatal overwhelming viraemia, viral pneumonia or secondary complications. It is not possible to give numbers for these in advance.

Deaths

- Excess mortality due to influenza is expected to be higher than in inter-pandemic years (when 12,000 excess deaths are estimated to occur). The impact of overall case fatality rates between 0.37% (based on inter-pandemic and 1957 experience) and 2.5% have been considered in table 2.

Table 2 Range of possible excess deaths based on various permutations of case-fatality and clinical attack rates, England and Wales

Overall case fatality rate	Clinical attack rate		
	10%	**25%**	**50%**
0.37%	19,300	**48,400****	96,700
1.00%	51,700	129,200	258,400
1.5%	77,100	192,700	385,400
2.5%	129,200	323,000	645,900

** Value used for planning purposes

Table 3 Range of possible excess deaths based on various permutations of case fatality and clinical attack rates, based on UK population

Overall case fatality rate	Clinical attack rate		
	10%	**25%**	**50%**
0.37%	21,500	**53,700**	107,500
1.00%	56,700	141,800	283,700
1.5%	85,100	212,800	425,500
2.5%	141,800	354,600	709,300

- Total deaths in the UK are normally around 12,000 per week. Total deaths are likely to gradually rise to at least twice this at the peak of a pandemic wave, and then gradually decline. However, there is the potential, in the more severe scenario, for as many deaths to occur over 15 weeks of a pandemic as normally occur in one year.
- Mortality rates are likely to vary considerably between different age groups. At least a third of the total excess deaths may be in people under 65 years compared with less than 5% in inter-pandemic years.
- Treatment with antiviral drugs should reduce both the extent and severity of the illness and possibly flatten the peak incidence.
- In the following discussion the seasonal/1957 case fatality rate of 0.37% has been used to illustrate the minimum that might be expected even with treatment.

Impact on health and social services

- The impact of a flu pandemic on health and social services is likely to be intense, sustained and nation-wide; both services may quickly become overwhelmed as a result of:
  - the increased workload of patients with influenza and its direct complications
  - the particular needs for high dependency care and infection control facilities and equipment
  - a secondary burden on health caused by anxiety and bereavement
  - depletion of the workforce and of numbers of informal carers, due to the direct or indirect effects of flu on themselves and their families
  - logistical problems due to possible disruption of supplies, utilities and transport as part of the general disruption caused by the pandemic
  - delays in dealing with other medical conditions
  - the longer term macro effects of the pandemic on the national [and world] economy.
- Innovative approaches will be needed to many aspects of health care, including staffing, triaging of patients and coping with those patients needing more intense care than is normally possible at home but who may not be able to be admitted to hospital.
- There will be pressure on mortuary facilities (possibly exacerbated by delays in death registrations and funerals).

Contacts with health care and potential need for hospital admission

- The tables that follow (4,5,6) contain estimates of anticipated cases, health care contacts, GP consultations, A&E visits, hospital admissions and deaths (again based on a uniform attack rate across all age groups). The associated temporal profile is illustrated in Figure 2.
- Primary 'health care contacts' refer to the equivalent of GP consultations in normal (i.e non-pandemic) periods. In the pandemic period it is assumed that all those with clinical symptoms would

present for treatment, both because of concerns about the illness and because the strategy, if possible, will be to treat all those with clinical symptoms with antiviral drugs. The demand on GPs and pharmacies will be such (table 5), that, at least at the height of the pandemic, some form of alternative provision will be required.

- Total health care contacts for influenza-like illness could increase from around 1 million during the period of a 'normal' season to around 15 million during a pandemic
- New health care contacts for influenza-like illness can be expected to exceed 1000 per 100,000 population per week during the main pandemic period (the base line is up to 30, and peak consultations during seasonal influenza periods in recent years have been 200-250 per 100,000 population per week; see Figure 1). At the peak of a pandemic, rates could reach 5000-10,000 per 100,000 population for 1-2 weeks.
- In a population of 100,000 people, PCTs should therefore expect to see at least 1000 new influenza patients per week during the pandemic period, and up to 5000 per week or more at the peak.
- Assuming a complication rate of 10%, with half of those who experience complications consulting a GP, GP practices can expect to see 50 new patients per 100,000 population per week, and 250 per 100,000 per week at the peak, with some form of complication.
- For children over 1 year but under 24 kg, antivirals will only be available on prescription. The majority of such children with clinical symptoms would need to visit a GP. This group represents approximately 5% of the UK population.
- In total GP practices can expect to see 100 new patients per 100,000 population per week, and 500 per 100,000 per week at the peak. This will put special pressure on single-handed practices.
- Similar numbers to those with complications seen by GPs might be expected to attend hospital A&E departments.
- Hospital admissions for acute respiratory and related conditions are likely to increase by **at least** 50% with around (at least) 20,000 new patients a week requiring hospitalisation at the peak. Again, in the absence of pandemic data, these are projected from current hospital admissions for influenza which are the minimum to be expected in a

pandemic. Demand for treatment for those with complications might be up to ten times higher, similar to those indicated for A&E consultations. Hospitalisations and deaths are likely to be greatest if the highest attack rates are in the elderly. The lowest burden on health care might be associated with higher attack rates in adults aged 15-64 years.

- A short sharp epidemic would put greater strains on services than a lower level but more sustained one.
- Antiviral treatment should reduce the size of the peak, the severity of the illness and possibly the total numbers of those with clinical symptoms. However, the extent of these reductions is difficult to predict.

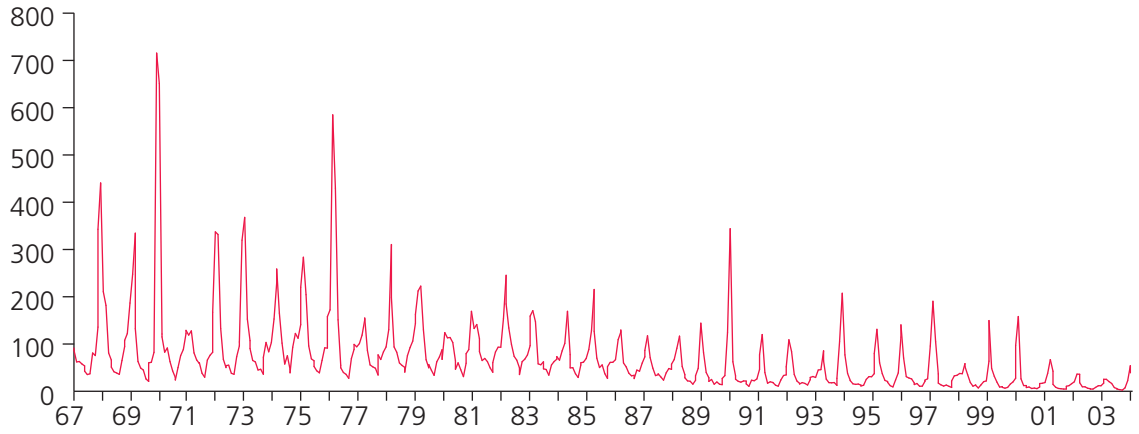

Figure 1. Historical record of GP consultations for new episodes of influenza-like illness, 1966/67 to 2003/04

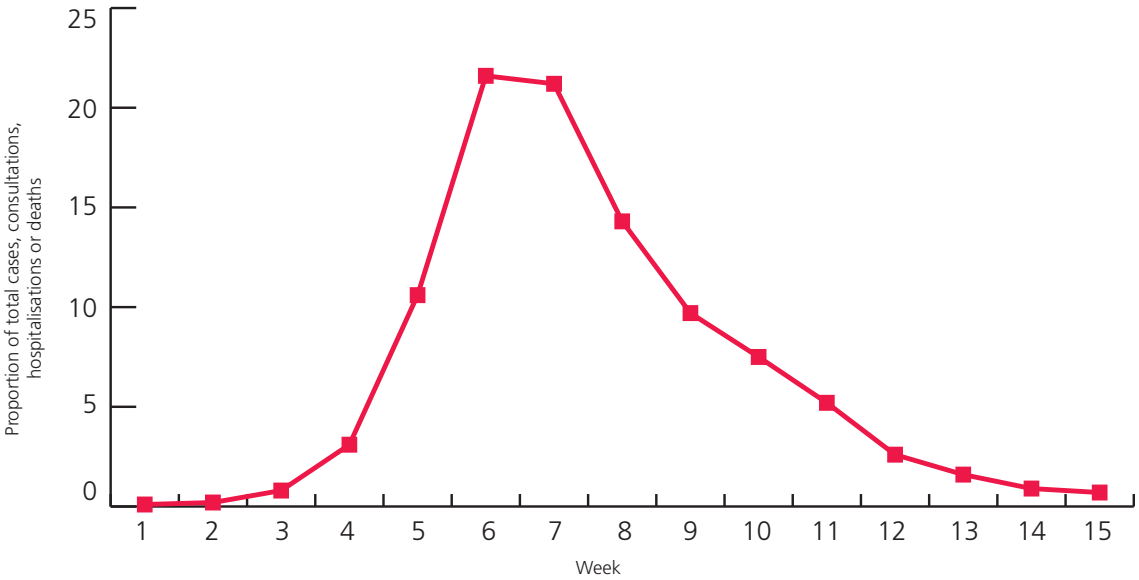

Figure 2. Illustration of the single wave profile showing proportion of new clinical cases, consultations, hospitalisations or deaths by week (see Annex D).

Table 4. Estimated burden of illness attributable to pandemic influenza over the entire pandemic based on a 25% clinical attack rate and illustrative case hopitalisation and case fatality rates of 0.55% and 0.37% respectively. Health Care Contacts represent the equivalent of GP consultations outside the pandemic period. It is envisaged that individuals experiencing symptoms will be diverted away from GPs in a pandemic. GP consultations represent the remaining contacts required to deal with complications and with young children (see text for explanation). Figures are rounded and represent work additional to normal background health service activity. (Figures in parentheses illustrate the range from 10% (lower limit) to 50% (upper limit) attack rates.)

Population	People with clinical symptoms/ Health Care Contacts	GP consultations	A&E presentations	Minimum excess hospitalisations	Minimum excess deaths
Population of 1,000	**250** (100-500)	**25** (10-50)	**13 (5-25)**	**1** (0-3)	**1** (0-2)
Population of 100,000	**25,000** (10,000-50,000)	**2,500** (1,000-5,000)	**1,250** (500-2,500)	**140** (50-300)	**90** (40-180)
Population of 1,000,000	**250,000** (100,000-500,000)	**25,000** (10,000-50,000)	**12,500** (5,000-25,000)	**1400** (500-3,000)	**900** (400-1,800)
England (population 49,000,000)*	**12,250,000**	**1,225,000**	**613,000**	**67,000**	**45,000**
Scotland (population 5,000,000)*	**1,250,000**	**125,000**	**63,000**	**6,900**	**4,600**
Wales (population 2,903,085)*	**750,000**	**75,000**	**38,000**	**4,000**	**2,800**
Northern Ireland (population 1,600,000)*	**400,000**	**40,000**	**20,000**	**2,200**	**1,500**
England and Wales (population 52,000,000)*	**13,000,000**	**1,300,000**	**650,000**	**72,000**	**48,000**
UK (population 60,000,000)*	**15,000,000**	**1,500,000**	**750,000**	**82,500**	**56,000**

* approximate figures

Table 5. Demand for Health Care Contacts by primary care unit: The table shows weekly totals for the number of new clinical cases, and thus potential demand for Heath Care Contacts, per 100,000 population, and per PCT, community pharmacy, GP practice or GP list of various sizes (see footnote for definition of 'small', 'medium' and 'large' as they are used in the table).

Period	Clinical Cases	Cases per 100,000	% of total cases	Cases per PCT			Cases per pharmacy			Cases per GP practice			Cases per GP list		
				small	medium	large	small	medium	large	small	medium	large	small	medium	large
Week 1	21,367	36	0.1	28	54	109	1	2	3	1	2	3	0	1	1
Week 2	30,400	51	0.2	40	77	155	2	3	4	2	3	5	1	1	1
Week 3	121,886	205	0.8	162	310	620	7	11	18	8	13	19	3	3	4
Week 4	464,219	780	3.1	617	1,181	2,360	28	41	67	29	49	72	10	12	15
Week 5	1,569,434	2,638	10.6	2,086	3,992	7,977	94	137	226	99	166	242	33	42	52
Week 6	3,206,013	5,388	21.6	4,261	8,155	16,295	192	280	462	203	339	494	67	85	106
Week 7	3,147,669	5,290	21.2	4,183	8,007	15,999	189	275	454	199	333	485	66	84	105
Week 8	2,122,779	3,568	14.3	2,821	5,400	10,790	127	185	306	134	224	327	44	56	70
Week 9	1,444,925	2,428	9.7	1,920	3,676	7,344	87	126	28	91	153	223	30	38	48
Week 10	1,122,055	1.886	7.5	1,491	2,854	5,703	67	98	162	71	119	173	23	30	37
Week 11	778,167	1,308	5.2	1,034	1,980	3,955	47	68	112	49	82	120	16	21	26
Week 12	387,404	651	2.6	515	985	1,969	233	34	56	25	41	60	8	10	13
Week 13	232,944	392	1.6	310	593	1,184	14	20	34	15	25	36	5	6	8
Week 14	128,240	216	0.9	170	326	652	8	11	18	8	14	20	3	3	4
Week 15	97,498	164	0.7	130	248	496	6	9	14	6	10	15	2	3	3
All weeks	14,875,000	25,000	100	19,770	37,839	75,606	891	1,299	2,145	942	1,572	2,292	311	396	494

Note:
In the above table, 'small', 'medium' and 'large' refer to the 2.5th, 50th and 97.5th percentiles for the population served by a PCT, community pharmacy, GP practice or GP list, as follows:

Population	PCT	Pharmacy	GP practice	GP list
small	80,000	3,600	3,800	1,200
medium	150,000	5,200	6,300	1,600
large	300,000	8,600	9,200	2,000

Table 6. Weekly totals for the number of GP consultations, A&E consultations, hospitalisations and deaths, across the UK and by health care unit. The values in the table assume that most heath care contacts are dealt with by special pandemic measures, leaving a residual 10% or 5% who will visit their GP or A&E department respectively (see text for details). The numbers for hospitalisations and deaths are based on case hospitalisation and case fatality rates of 0.55% and 0.37% respectively. They should be considered the minimum expected for pandemic flu.

Period	Case per	% of overall	GP Consultations		A&E Consultations		Hospitalisations		Deaths	
	100, 000	total	UK-wide	per GP	UK-wide	per A&E	UK-wide	per hospital[1]	UK-wide	per hospital[2]
Week 1	36	0.1	2,155	0	1,077	3	119	1	80	0
Week 2	51	0.2	3,066	0	1,533	5	169	1	113	1
Week 3	205	0.8	12,291	0	6,146	19	676	3	455	2
Week 4	780	3.1	46,812	1	23,406	72	2,575	13	1,732	9
Week 5	2, 638	10.6	158,262	4	79,131	243	8,704	43	5,856	29
Week 6	5,388	21.6	323,295	8	161,648	496	17,781	88	11,962	59
Week 7	5,290	21.2	317,412	8	158,706	487	17,458	86	11,744	58
Week 8	3,568	14.3	214,062	6	107,031	328	11,733	58	7,920	39
Week 9	2,428	9.7	145,707	4	72,853	224	8,014	40	5,391	27
Week 10	1,886	7.5	113,148	3	56,574	174	6,223	31	4,186	21
Week 11	1,308	5.2	78,471	2	39,235	120	4,316	21	2,903	14
Week 12	651	2.6	39,066	1	19,533	60	2,149	11	1,445	7
Week 13	392	1.6	23,490	1	11,745	36	1,292	6	869	4
Week 14	216	0.9	12,932	0	6,466	20	711	4	478	2
Week 15	164	0.7	9,832	0	4,916	15	541	3	364	2
All weeks	25,000	100	1,500,000	39	750,000	2,302	82,500	409	55,500	275

1 Any hospital with a critical care unit
2 Assuming, for ilustrative purposes only, that all deaths occur in hospital

Absence from work

- Work patterns have changed so much since previous pandemics that it is unwise to extrapolate from historical data on sickness absence.
- Absence from work will depend on the age-specific attack rate, although even if working age people are relatively spared, additional absenteeism may result from staff needing to take time off to care for family members, or difficulties with transport.
- Accelerated transmission may occur in the workplace, resulting in staff being ill during a narrower time frame than in the general population.
- It is suggested that business continuity plans are based on a cumulative total of 25% of workers taking some time off – possibly 5-8 working days – over a period of 3 to 4 months.

- Modelling suggests absenteeism due to the pandemic will rise to a peak of 5-7%, the higher number including those who would need to look after those who are ill. This equates to about three times the normal average absenteeism in a private sector company and double that in the public sector. Even in the reasonable worst case of a 50% attack rate these figures only rise to 10-15%. However the absenteeism rate would not be uniform and some employers may be particularly badly affected.

- In the absence of vaccination, those in occupations with particularly high exposure such as health care workers will have higher absenteeism. In Liverpool in 1957, between 12 and 19% of nurses were absent during the first 4 weeks of the pandemic; in one hospital nearly a third were absent at the peak.

- The skill mix required in some occupations, including health care, may limit the extent to which other staff can be redeployed.

Schools and other closed communities

- Influenza will spread rapidly in schools. In 1957, for example, up to 50% of schoolchildren developed influenza, but even those schools which were most severely disrupted had returned to normal 4 weeks after the appearance of the first case. In residential schools, attack rates reached 90%, often affecting the whole school within a fortnight. This will impact on working parents.

- However, closing schools has a significant impact on business continuity and maintenance of essential services, particularly health care, due to parent workers needing to stay at home for childcare.

- Similar spread is likely in other closed communities such as residential care facilities, barracks and prisons.

Impact on other services

- In the absence of early or effective interventions, there will be an effect on all other services, through staff sickness, any travel restrictions imposed and through the knock on effects of other disrupted businesses and services.

- This includes all non-health ‘first responder’ services (police, fire etc), the military, other essential services (eg utilities, fuel supply, food production and distribution, transport), prisons, education and businesses.

- Services such as death registration and funeral directors will have an increased work load.
- In addition to maintaining continuity of their work, badly affected businesses will need to consider, for example, the security of premises, including manufacturing plants. Further advice on business continuity is available on the UK Resilience website at www.ukresilience.info.

Impact on travel

- Travel will be impacted through:
  - any explicit advice or restrictions on travel and public gatherings as a policy option
  - people opting not to travel (eg because of cancellation of work/school etc, fear of acquiring infection through travel or fear of leaving home)
  - availability of fuel and transport workers.

Public, political and media concern

- There will be high public and political concern and scrutiny at all stages of an influenza pandemic.
- Press interest, need for information and coverage will be intense.
- Managing people's concerns and expectations will be a key part of the response.
- People's concerns will extend to what is happening in other countries, particularly those with which they have family connections.
- Interest and concern will also extend to national and international events and mass gatherings.

4.4 Extent to which interventions might ameliorate the impact

More detail is given in later chapters in this Plan, but in summary:

- vaccination with a vaccine specifically formulated against the pandemic virus strain, **when an appropriate vaccine becomes available**, can be expected to achieve the greatest reduction in illness, complications and deaths, and lessening of the impact on health and other services, although the effectiveness of a pandemic vaccine will not be known until it is in use. Even in inter-pandemic years, when the virus strains predicted to be circulating the following winter, and included in the vaccine, are well matched to those which actually do occur, vaccine reduces infection by around 70-80%, hospitalisations in high risk individuals by around 60% and deaths by around 40%

- much work has been done on the most effective strategies for the use of antiviral drugs. If treatment with antiviral drugs provides benefits of the same order as those demonstrated during seasonal influenza, early treatment (within 48 hours of onset of illness) should shorten illness by around one day, reduce the severity of the symptoms, and reduce the need for hospitalisation. If, as planned, it is possible to treat all those with clinical symptoms, there should be a reduction in the number of hospitalisations needed (by around 50%), and deaths, and possibly in the size of the peak and the total numbers affected. However, the effectiveness of antivirals in a pandemic, and particularly in reducing mortality in cases of severe disease (including primary viral pneumonia), is not known. Predicting precisely how large these effects would be is impossible with current information.

- the amount of antiviral drug required if it were to be taken to prevent people getting the disease over the entire pandemic period is prohibitive and a treatment strategy is the only realistic option, other than in some very specific circumstances.

- international travel restrictions and screening passengers on entry to the UK would only have a very limited impact on the arrival of pandemic influenza in the UK. Only in some very special situations would it be possible to use travel restrictions to delay arrival by any significant period.

5. The Plan: key elements

The contingency plan is built around key headings:

Leadership, organisation and co-ordination: the chain of command

Communications
- Strategic and operational communications and advice
- Professional information and guidance
- Communications with the public and the media

Surveillance, information gathering, situation reporting and risk assessment
- Microbiology and virology

The public health response: measures to reduce the health impact
- Vaccination
  - Vaccine development licensing, registration and supply
  - Immunisation strategy
- Antiviral agents and their use
- Other public health control measures

The health service response
- Investigation and management of cases and contacts
- Infection control
- Organisation and reinforcement of health services

The civil contingency response: reducing societal disruption

Workforce, education and training

Essential preparatory work, research, legal and indemnity issues

International issues

Each has strategies through the progressive phases of the response; the structures and systems to deliver them, either in place or ready to be established should the need arise; and their own planning requirements. Enough flexibility is retained to adapt to the specific circumstances of a new pandemic, which at the current time remain uncertain. More detail is in the annexes, where appropriate, or in more specific guidance issued separately and listed at the end of this Plan.

One of the major challenges of an influenza pandemic will be to develop and manufacture a specific vaccine in the shortest possible time, and immunise the whole population. This will take time, however, and plans are therefore based on there being no vaccine during the first wave. The main strategy during the first wave will be to treat those who become ill

with antiviral drugs. The UK is building up a stockpile of antiviral drugs for this. Other public health and 'social distancing' measures may be helpful in reducing the risk of infection to the individual.

5.1 Leadership, organisation and co-ordination: the chain of command

The SARS outbreaks of 2003 demonstrated the importance, in the event of an incident on the likely scale of an influenza pandemic, of strong international and national leadership and co-ordination, and a clear national 'command and control' structure. The appropriate people at all levels must have authority to make key decisions and act on them, with a clear chain of accountability, again, at all levels.

The response to an influenza pandemic will be on a UK-wide basis. The Department of Health is the lead Government Department. There is clear demarcation of roles and responsibilities between the separate UK administrations and other key organisations (Chapter 6). The arrangements build on the structures developed for other contingencies.

5.2 Communications

Effective communications provide the backbone for an effective and co-ordinated response. The Department of Health is leading the development and implementation of a comprehensive communications strategy (Annex I). It is recognised that a wide range of groups at all levels will need accurate, timely and consistent information and advice. It is also recognised that rumours and misinformation will abound, and, inevitably, the media will sometimes report information before it can be confirmed through official channels.

Strategic and operational communications and advice

Two way strategic and operational communications will involve central Government Departments; the Devolved Administrations; Health Protection and NHS organisations at all levels; international agencies; and all other agencies and organisations involved in the response. Systems are in place for communications between the main organisations, and are tested in exercises. Either at Phase 5 or 6, the Department of Health will activate its operations room as the hub for strategic and operational communications with the Department, and a timetable will be established.

Once a pandemic has been declared, the Government's News Co-ordination Centre will be set up (co-ordinated by GCN) to co-ordinate cross-Government briefing and public information.

Professional information and guidance

Regular information bulletins to health professionals will be issued as required by the Department of Health via already established routes (as urgency indicates, CMO letters, Public Health Link). Up to date information will also be maintained on the DH and HPA websites.

Clinical guidance and public health advice will be maintained on the HPA website, and issued directly to relevant groups as necessary.

Communications with the public and the media

Public

Research commissioned by the Department of Health shows current awareness of pandemic influenza and its likely impact is low. Risk communication both before and during a pandemic is a key element of the response. Emphasis in the inter-pandemic period will be on the uncertainties surrounding a pandemic, advice on measures to reduce risk to the individual, and the constraints faced by Governments in preparing their response. Later communications will concentrate on what factual information people need to hand, and what action they should take.

Clear, active engagement of the public will be a priority throughout a pandemic through, for example:

- readily accessible, easy to understand and regularly updated information and advice (as far as possible, draft materials for later Phases are being prepared in advance, informed by research and pre testing).
- in addition to the information directly disseminated to the public and that available from GP surgeries and walk-in centres, **NHS Direct and its equivalents in the DAs**, and **NHS Direct on-line**, will provide key points to health-related advice and will be one mechanism for providing feedback on public concerns
- sharing the advice of expert groups with the public
- having lay members, where possible, on expert advisory groups
- briefing the specialist media on the preparations and plans
- patient fora and focus groups to help identify public concerns
- Regional Media Emergency Forums
- working with the media to promulgate public health messages

- training trusted spokespeople in advance
- the patient choice agenda.

Media

Central co-ordination of media communications will initially be by the Department of Health press office, supported by the News Co-ordination Centre. Depending on the scale, NCC will also co-ordinate the media and public communication for the other Government Departments involved.

5.3 Surveillance, information gathering, situation reporting and risk assessment

Timely, up to date surveillance and other information are needed by a variety of audiences at all levels (eg local regional, national) in order to provide evidence based risk assessments and policy advice and to inform decision making at all phases of the response.

Information needs during a pandemic will be more demanding than routine influenza surveillance or other monitoring systems currently provide for. For instance, Government will need regular timely information on the extent and impact of the pandemic across the whole country; the mathemtical modellers will need timely, early data in order to refine their estimates of the impact; public health policies may need to change emphasis; and guidance to clinicians may need to change. A key action in the inter-pandemic period is therefore to understand the data requirements of the key players, so that, as far as is practicable, they can be fulfilled at the time. This presents technical challenges, and may put additional burdens for data provision, collection, collation and dissemination on people whose main priority is delivering health or other care. 'Customers' of surveillance information need to understand the possible constraints in providing it. An underlying principle is that data collections are rationalised at local, regional and national levels, to avoid unnecessary duplications.

Annex F provides more detailed information on surveillance.

International surveillance

Surveillance for influenza starts with good internationally co-ordinated monitoring of prevalent influenza viruses worldwide and the illness due to them, primarily to inform routine vaccine production but also to assess their virulence and antigenic diversity. The UK contributes to this surveillance, which is co-ordinated, for human influenza, by the World Health Organization, and for animal influenza, by the Office International Epizootic (OIE). To improve international surveillance, more robust clinical, virological and epidemiological surveillance is required in

China and SE Asia, linked to surveillance of influenza viruses in birds and relevant mammals.

UK surveillance

UK surveillance combines epidemiological, virological and other data from a wide variety of sources, with the aim to:

- monitor prevalent viruses, and the disease due to them
- make a full contribution to international influenza surveillance through the WHO and European surveillance schemes
- identify a novel virus at the earliest opportunity (including in birds or mammals):
  - to characterise the virus
  - to inform vaccine development work
  - to enable possible early interventions to delay or slow its spread
  - to define its susceptibility to antiviral drugs.
- Monitor any changing characteristics of the virus in order to adapt policies (including vaccine recommendations) if necessary.
- Co-ordinate with animal health surveillance to assess the risks of a new human or mammal/bird influenza virus crossing species.
- Identify clusters of unusual respiratory illness that may be caused by a new virus.
- Monitor the spread of a new virus and define its epidemiological features, for example, the type and severity of illness and the impact in different age or population groups to inform planning and policies.
- Provide information on significant outbreaks.
- Monitor the microbial causes, and antimicrobial susceptibility, of complications to inform treatment policies.
- Monitor deaths.
- Monitor the uptake and effectiveness of any interventions (including possible adverse reactions).

It is recognised that the objectives of surveillance will change as the

pandemic evolves. The different phases will trigger enhancements – such as closer monitoring of particular population groups, including laboratory workers – or changes in emphasis. Flexibility will therefore be maintained in the indices collected as a pandemic progresses.

Surveillance information, including monitoring of vaccine uptake and the impact of interventions, will be disseminated to a wide range of people to inform practice and planning.

Situation reporting (in the NHS)

The NHS routinely provides Situation Reports to the Department of Health which will be used in a pandemic to monitor the impact on health services and inform operational planning.

Actions to improve surveillance

In addition to work on the information needs of key stakeholders, the UK plans to:

- maintain alertness among clinicians and virologists to recognise the unusual. Influenza is a common condition and has symptoms similar to those of many other viral respiratory infections. Respiratory illness in a patient with a link to areas where a new virus has been already identified, or to poultry farming, should be reported promptly. The HPA has developed a protocol for investigating such patients.
- increase the coverage and frequency of reporting from general practice-based surveillance
- establish a case based field information management system that links epidemiological and laboratory data
- establish a central web based 'portal', to improve collation of information from disparate sources (DH)
- improve monitoring of antiviral susceptibility
- establish a real-time system to monitor vaccine efficacy
- include monitoring of long term health sequelae of infection with a pandemic strain of influenza virus.

Microbiology and virology

Laboratories confirm diagnoses, elucidate the characteristics of viruses, and are essential to overall surveillance. The UK has a network of clinical virology laboratories with the capability to isolate influenza viruses. A

proportion of isolates, including all unusual ones from the whole of the UK, should be refered to the National Influenza Reference Laboratory at the HPA, Colindale for detailed identification. A UK capability and capacity to identify novel influenza strains will be maintained, with the ability to roll out a diagnostic capability to the network of peripheral laboratories if required.

The HPA, working with other laboratories, aims to:

- maintain laboratory methods at the cutting edge
- develop and maintain reagents for routine and reference laboratory diagnostic tests
- ensure a surge capacity in virology laboratories at local and reference levels in the event of a pandemic
- develop and maintain capacity for antiviral susceptibility testing
- ensure a surge capacity for bacteriological diagnosis of complications of influenza
- ensure laboratory staff protection and compliance with all necessary biosafety and security requirements.

5.4 The public health response: measures to reduce the health impact

The public health response covers the application of population control measures. It also includes the field investigation, handling and feedback of information from suspected incidents and outbreaks by appropriately trained personnel, using appropriate protocols and proforma. The results of epidemiological investigations need regular review to redefine the protocols and develop or adjust the recommendations to prevent or control the (further) spread of the disease.

Public health control measures are broadly 'medical' (vaccination, and the use of antiviral drugs) or 'social' (personal hygiene and 'social distancing' measures to reduce transmission or slow the spread of infection.

Immunisation

In inter-pandemic years, immunisation is the cornerstone of influenza prevention. Production of an appropriate vaccine is possible each year because of scientists' ability to predict the strains of virus most likely to be circulating that year. These routine vaccines will not protect against a

pandemic strain of influenza. Pandemics – and the viruses causing them – are by their very nature impossible to predict with certainty. So, although as much work as possible will be undertaken to pave the way for production of a suitable vaccine, **a specific vaccine is unlikely to be available in any quantity at least in the early stages of a pandemic**. There will therefore be 3 stages in the public health strategy:

1. No vaccine available

2. Vaccine in limited supply

3. Vaccine widely available

Even when a good match is achieved between an influenza vaccine and the prevalent circulating virus or viruses, vaccination is not 100% effective in preventing illness and the protection afforded can vary from year to year. There is evidence to suggest that a vaccine against a new influenza strain to which no-one has been exposed before requires a larger dose, or more than one dose or a different formulation of vaccine, to achieve optimal protection. An appropriately formulated vaccine, in an appropriate dose and schedule, can be expected to reduce the impact of pandemic influenza, particularly by reducing complications, hospitalisations and deaths among those groups most at risk of serious illness and death.

Vaccine development

One of the greatest challenges in responding to a pandemic will be to develop, in the shortest possible time, a safe, immunogenic vaccine which protects against the pandemic strain of virus. Influenza vaccine production takes time and is subject to various rate-limiting factors. There may be additional technical problems in preparing a pandemic vaccine. Further details of current vaccine development, testing and licensing are at Annex G. Potential problems in developing a pandemic vaccine are also outlined together and some issues which need to be addressed connected to vaccine development, production and licensing.

Since a pandemic vaccine will be different from routine influenza vaccines in some important respects, and may be presented in multidose vials – rather than single syringes – and contain thiomersal as preservative, it will need new regulatory approval. The EU has prepared a model 'core dossier' for companies to use when applying for regulatory approval of a pandemic vaccine. Approval is sought based on a prototype 'mock up' vaccine. Once a pandemic virus is known, a vaccine is made in the same way, but with the pandemic virus, and a variation in the license sought, which can be dealt with much quicker.

Work is underway to facilitate development of a suitable vaccine when the time comes through:

- improving routine influenza vaccines
- developing and maintaining a 'bank' of virus strains which, if made up into a vaccine, may provide some cross-protection against a strain with the same haemagglutinin
- developing engineered candidate pandemic vaccine strains, based on forecasts of possible genetic changes relevant to a pandemic, or assessments of the pandemic potential of a new virus
- banking possible potency testing reagents
- undertaking clinical trials of candidate vaccines to assess safety, immunogenicity and dosing schedules
- taking a 'mock' pandemic vaccine through the regulatory framework in order to speed the process for a subsequent pandemic vaccine made the same way
- optimising manufacturing capacity and capability, in discussion with manufacturers
- increasing understanding of the implications of a pandemic vaccine which is different from routine influenza vaccines
- establishing liability arrangements for possible unexpected adverse reactions to the vaccine and for the contingency that manufactured vaccine is later not required
- resolution of issues relating to intellectual property rights.
- improving manufacturing capacity and capability.

Once WHO has recommended that production of a pandemic vaccine proceeds, manufacturers will need to switch from seasonal influenza vaccine production. We are working closely with other countries, the World Health Organization, the European Commission and manufacturers to ensure that a vaccine can be developed as quickly as possible once a pandemic flu strain emerges and to put arrangements in place to ensure production of vaccine for the UK population.

Vaccine supply

Even with advance work to improve our preparedness for vaccine production, the lead time before a new vaccine becomes available in quantity is likely to be at least 4-6 months. There may be no vaccine initially and then availability will depend on production rates. At the same time, international demand for vaccine will be high. Vaccine will have to be distributed equitably and administered to pre-determined priority groups first, according to nationally agreed recommendations.

The Department of Health (England) will lead on purchasing and supplying a pandemic vaccine on behalf of the whole UK, liaising with the devolved administration Health Departments.

The UK currently immunises just over 70% of people aged 65 and over, and around 50% of people in designated clinical risk groups in the annual national influenza immunisation programme. This accounts for 20-25% of our population. In a pandemic, the aim will be to obtain vaccine for a far greater proportion of the population, and, ideally, the whole population, as vaccine becomes available, bearing in mind that a two dose schedule may be required and may further constrain more extensive coverage.

It is possible that limited supplies of a suboptimal, and possibly experimental, vaccine may be available before a definitive licensed pandemic vaccine. This would have potential use to offer protection to the highest risk groups such as laboratory staff who are working directly with the new virus.

Immunisation strategy

A tiered approach to immunisation is planned, immunising tranches of the population in stages according to the availability of vaccine. The increased risk faced by health care workers treating patients, and the need to keep health and other essential services running, means that if vaccine supplies are limited, health care workers, and possibly some other essential service key workers, may need to take precedence over some of the risk groups prioritised for vaccine in inter-pandemic years.

The Joint Committee on Vaccination and Immunisation (JCVI) has recommended the following provisional aims of a vaccination strategy:

- protect health care workers occupationally most at risk. Health care workers with patient contact, in addition to being essential to the health service response, are likely to be at increased risk of acquiring infection from their patients and passing it on to vulnerable patients

- prevent illness, and thus absence, among workers required to keep essential services going. These will be identified according to lists

being prepared as part of other emergency planning work, subject to further assessment currently underway of the advantages and disadvantages of such an approach

- prevent serious illness in the (anticipated or confirmed) most vulnerable groups
- reduce the spread of influenza in situations where it might spread particularly rapidly, for example in closed communities such as residential care homes
- reduce spread by immunising those more likely to transmit the virus, eg children
- prevent illness in the general population.

Final decisions on the priority groups, and the priority order, will be made by the UK National Influenza Pandemic Committee, informed by emerging evidence, and any recommendations from the World Health Organization and the JCVI, using the above criteria as guiding principles.

Further details of the strategy are at Annex G.

Pneumococcal immunisation may prevent some of the complications due to secondary pneumococcal infection following influenza infection (but will not, for example, prevent other bacterial complications such as staphylococcal pneumonia). Part of preparedness planning will be to improve uptake of pneumococcal vaccine among the risk groups for whom it is routinely recommended (currently people aged 65 and over and certain clinical risk groups).

Operational aspects of immunisation

Vaccine will be centrally purchased by DH on a UK basis and is likely to be distributed on allocation according to estimated local needs for the predetermined priority groups. Operational guidance for delivery of vaccinations is being developed, but these arrangements can only be finalised once details such as vaccine formulation, dose and dose schedule are known. It is likely that:

- occupational immunisation will be based in the workplace
- GPs and nurses will play a major role in mass community immunisation plans, learning from experience during the development of other mass vaccination campaigns
- the potential for administration by other groups, eg pharmacists, will be explored.

Managing public/patient expectations regarding vaccination

An important part of the communications strategy will be to inform the public about the reasons for vaccine not being generally available and to manage their expectations. The public will also need information to inform their own decisions about vaccination, for example about any possible potential for a pandemic vaccine to cause adverse reactions.

Antiviral agents and their use

Antiviral agents active against influenza are the only other major medical countermeasure available. More information on these agents is at Annex H. They will be used in the absence of, and, once vaccine becomes available, as an adjunct to, vaccination. However, there are limitations to their use, their effectiveness in a pandemic situation has yet to be tested and antiviral resistance may be – or may become – a problem.

Manufacture of antiviral drugs takes several months, and their availability cannot be assured at the time of a pandemic, when international demand will be high. A UK stockpile of antiviral drugs is therefore being built up against the contingency of an influenza pandemic. The stockpile, when complete, will be sufficient to treat 25% of the population, the scenario considered most likely. However, as with other resources, **the drugs will need to be given in the most effective way on operational, clinical and cost-effectiveness grounds** taking into account the stocks available.

If treatment with antiviral drugs provides benefits of the same order as those demonstrated during seasonal influenza, early treatment (within 48 hours of onset of illness) should shorten illness by around one day, reduce the severity of the symptoms, and reduce the need for hospitalisation. If, as planned, it is possible to treat all those with clinical symptoms, there should be a reduction in the number of hospitalisations needed (by around 50%), and deaths, and possibly in the size of the peak and the total numbers affected. However, their effectiveness in a pandemic, and particularly in reducing mortality in cases of severe disease (including primary viral pneumonia), is not known. Predicting precisely how large these effects would be is impossible with current information.

Strategies for the optimal use of antiviral drugs

The National Institute for Clinical Excellence (NICE) guidance for the use of antivirals for seasonal influenza **does not apply in an influenza pandemic**.

Until more information becomes available, general principles have been established. More detailed clinical guidance will be issued as necessary and as further information becomes available. Final decisions on strategies, and priority groups, for the use of antivirals will be made by the UKNIPC, informed by any recommendations from WHO or the relevant UK expert advisory mechanisms.

The provisional strategies proposed are:

Phase 2: Potential prevention of a pandemic virus emerging
In the event of outbreaks of highly pathogenic avian influenza in poultry, antiviral agents will be offered to occupational groups exposed to dead or diseased birds. This is for their personal protection, but also to protect against establishment and evolution of avian influenza viruses in people. Further details are provided in the Defra Avian Influenza Contingency Plan.

Phases 3/4: Prevention of evolution of a new virus causing human infection
Antivirals will be used to treat cases.

Phase 5 and possibly very early in Phase 6: Possible 'abortion' of a potential pandemic or delay in its establishment and spread
At this stage, this would involve treatment of a symptomatic case or cases and short term prophylaxis (taken for the duration of the incubation period, usually 7 days) to prevent infection developing in those of their close contacts (including health care workers) potentially exposed. This will be done on a case by case basis and is likely to be a short-term strategy, and not the main use of antiviral drugs.

Phase 6: Treatment of cases
This will be the main strategy once a pandemic is established. Until the full stockpile is established, or if the clinical attack rate is greater than the 25% planned for, treatment will be offered in provisional order of priority, to:

- health care workers, if and when they develop fever or other influenza-like symptoms (regardless of whether vaccinated)
- unimmunised people in high risk groups (or groups emerging information suggests are at special risk), to ameliorate illness and reduce complications and death

- other unimmunised people
- immunised people, using the same criteria as above, if emerging information suggests the vaccine being used is not effective at reducing serious illness, complications or deaths.

Limited use of antiviral drugs may be recommended, if supplies allow, to limit the spread in certain defined situations such as, for example, in a closed institution suffering an outbreak.

Longer term prophylaxis on a population level (ie taking the drug to prevent infection throughout the period of possible exposure) is not considered likely to represent an efficient use of the drugs (bearing in mind the virus may be circulating in the population for several weeks or months).

As with seasonal flu, it is likely that for maximum effect the drugs will need to be started as soon as possible and within 48 hours of (for treatment) onset of symptoms or (for post-exposure prophylaxis) exposure to infection.

Supply and distribution of antiviral drugs

Antivirals are being centrally purchased by DH on a UK basis, in liaison with the devolved administration Health Departments, and distributed on allocation.

Operational guidance has been issued on the distribution and supply of stockpiled antiviral drugs, and will be updated as necessary. The guidance recognises that use of antivirals in the pandemic situation presents challenges and issues for the configuration and capacity of primary care services. Primary care organisations' dispensing plans will need to meet the requirement that patients in the designated groups start treatment within 48 hours of onset of symptoms (or, for prophylaxis, exposure). Pharmacists are likely to have a role.

UK and non-UK residents will be expected to have equal access to drugs.

Monitoring effectiveness and adverse reactions

As part of the antiviral strategy, arrangements will be put in place to monitor the susceptibility of the virus to antiviral drugs, assess their effectiveness in reducing complications and deaths, and to monitor the incidence and patterns of adverse reactions in order to further inform policy.

Other public health and/or 'social distancing' measures to reduce morbidity and/or contain spread

With or without medical countermeasures, other public health and 'social distancing' interventions may be helpful in reducing an individual's risk of infection. The following public health measures are being kept under review. Clear guidance will be issued, based on the advice of the UKNIPC, guidance from the WHO or real time modelling as the evidence evolves or as need arises. Infection control guidance for non-health care settings is being developed and will be maintained on the HPA website.

International travel
During the outbreaks of Severe Acute Respiratory Syndrome (SARS) in 2003, internationally agreed measures were instituted, designed to restrict the movement of people possibly infected with SARS and were assessed by WHO to have greatly contributed to bringing the disease under control.

Influenza is more infectious than SARS, is most infectious early in the course of the disease (and possibly even before symptoms begin), and has a much shorter incubation period (1-3 days). These important differences make it unlikely that similar interventions will do more than delay or slow the transmission of pandemic influenza at best, but this may still be deemed useful. Possible measures include:

- travel advice, on travel to and from affected countries
- health information for exiting and returning travellers
- health screening at ports.

National travel
- Reducing unnecessary, especially long distance, travel may help slow the spread of infection at the beginning of the pandemic in the UK.
- Local restrictions in the movement of people, eg in a community or town, are unlikely to have much impact.

Mass gatherings
- Decisions on whether to restrict mass gatherings will depend on whether they are local, national or international events, the size, duration, and whether in confined spaces or the open air.
- Closing schools will have an impact on maintaining the workforce in other sectors.

Personal and respiratory hygiene

- People can reduce, but not eliminate, the risk of catching or spreading influenza during a pandemic by:
  - covering their nose and mouth when coughing or sneezing, using a tissue when possible
  - disposing of dirty tissues promptly and carefully – bagging and binning them
  - avoiding non-essential travel and large crowds whenever possible
  - maintaining good basic hygiene, for example washing their hands frequently with soap and water to reduce the spread of the virus from their hands to their face, or to other people.
  - cleaning hard surfaces (e.g. kitchen worktops, door handles) frequently, using a normal cleaning product
  - making sure their children follow this advice.
- If someone catches flu, they should:
  - stay at home and rest
  - take medicines such as aspirin, ibuprofen or paracetemol to relieve the symptoms (following the instructions with the medicines). **Children under 16 must not be given aspirin or ready made flu remedies containing aspirin**
  - drink plenty of fluids.

Staff rostering

- Staff rostering to minimise interchange of staff between teams may help, for example in health care settings, to reduce the impact on staffing. If one member of a team becomes ill, all contacts in the team are asked to remain in voluntary quarantine.

Some of the above measures may be required as a result of staff absence or the general disruption, or may occur by default because of public concern or other considerations. Voluntary co-operation with recommended measures would be sought. Mandatory quarantine and curfews are generally not considered necessary and are not currently covered by public health legislation.

5.5 The health service response

The health service will provide co-ordinated local arrangements for the efficient, safe clinical management of cases (and suspected cases) and their contacts in primary, secondary and long term residential care (including by ambulance services). Maintaining services in the face of unprecedented demands and disruption will present logistical problems. Health service organisations and personnel also have a role in supporting the public health response, and will be required to supply data for surveillance and for local and national monitoring of the pandemic's impact.

Investigation and management of cases and contacts

The public will require clear guidance as to who should self-care (and how), and who should seek medical assistance, when, how and where. DH will provide national materials, to be adapted to local needs. NHS Direct and NHS24 'sleeping scripts' and management protocols for patients will be agreed in advance, but kept under review to take account of experience gained as a pandemic evolves.

Provisional clinical management guidelines for adults and children, in the community and hospital, are being developed, led by the HPA in consultation with relevant clinical groups. They will be posted, and kept up to date, on the HPA and Health Protection Scotland (HPS) websites, taking account of clinical experience as necessary.

Health services plans must include plans for the efficient dispensing of antiviral drugs within the agreed protocols, so that those recommended for antivirals are able to start them within 48 hours of onset of symptoms. Separate guidance has been issued by the Department, and will be updated as necessary. (available at www.dh.gov/pandemicflu)

Mechanisms will be established to collect information on the outcomes of the various treatment regimens being used nationally (and for accessing internationally-relevant information) so that best practice can be built on the results of real time evaluations.

Infection control

Infection control guidance has been developed, led by HPA, primarily for health, social care and community settings, but based on principles applicable to other settings. These will be kept under review and maintained on the HPA and HPS websites.

Organisation and reinforcement of health services

Operational guidance for health service planners has been issued as an adjunct to this plan. Depending on the number of cases, the NHS will need to establish ways of caring for large numbers of patients on a scale

outside their normal experience, including for those of all ages requiring high dependency care. Some of the key decisions in local planning include:

- Provision of staff protection equipment
- Where patients are to be seen and assessed
- How to 'triage' patients, ie to quickly assess their needs and ensure they are directed to the appropriate care, in primary care and hospitals
- Where patients are to be treated and admission criteria
- The provision of diagnostic services and the safe handling of specimens (following national protocols)
- How to maintain care for those staying in their own homes
- The logistics of maintaining supply of equipment and pharmaceuticals, including the blood supply
- Cancellation or reorganisation of routine activity where possible
- How other work is to be re-organised
- How to roster staff to minimise the spread of infection in health care premises, maintain the right skill mixes, but ensure that they all get time off
- How additional mortuary space is to be provided and safe practice for mortuaries
- How to manage the interface between primary care and Accident and Emergency Departments when primary care services are under pressure.

5.6 The civil contingency response: reducing societal disruption

This plan is mainly concerned with the health response to an influenza pandemic, but health services will be looking to other Government Departments and other agencies to assist with the successful implementation of the health response. Additionally, all organisations, including businesses, need to consider the implications for their organisations, based on the information in this plan, and make their own business continuity plans. Further detail is provided in Annex J.

Existing civil contingency plans will come into effect should the scale of a pandemic warrant it. These cover, for example:

- maintenance of essential services such as emergency services, transport, food distribution, pharmaceutical supplies, utilities and communications
- management of mass casualties
- maintenance of public order
- the role of the police and armed forces.

5.7 Workforce, education and training

All organisations need to consider the implications of staff absence (because of sickness, or the need for staff to take time off to care for others), at a time when the workload for some may be increased. This will include:

- establishing minimum staffing levels
- identifying a 'front line' group of essential staff
- considering the need to transfer or redeploy staff to do jobs they may not be trained to do or familiar with, or to recruit additional staff or volunteers
- ensuring a system for vetting additional staff, including volunteers
- accommodation, for example portacabins with bunks for people to rest between shifts when transport home may be difficult or disrupted.

Staff rosters must allow for adequate break and leave periods to ensure a sustainable response over several weeks.

The educational and training needs of both regular staff and staff drafted in or redeployed should be considered as part of preparedness planning, but will need to continue during the response. Some of these are:

- appropriate staff training
- training of volunteers
- teaching staff how to handle and work with volunteers – although there will be regular volunteers, e.g. St John Ambulance staff, staff may not know who they will be working with until a shift starts and cannot assume their skills and experience
- keeping a database of former or recently retired clinical staff or local doctors who may be called upon to help
- including the need for surge capacity in regular planning.

Staff may also need psychological or morale building support during what will be a difficult time at work and at home.

Testing plans is part of the training framework.

5.8 Essential preparatory work, research, and legal and indemnity issues

Underpinning work during the inter-pandemic period will aim to improve our preparedness across all systems and ease demands on people's time at the time of the pandemic by thinking through problems in advance.

Immediate research needs include:

- ongoing work into development of new improved influenza vaccines, in particular the development and best use of a pandemic vaccine
- the optimum use of antivirals
- the virology and epidemiology of influenza viruses, in particular previous pandemic strains
- practical infection control issues
- ongoing modelling of the likely impact of interventions
- behavioural research.

A framework will be developed and maintained of key research issues which could be addressed during a pandemic, with protocols in place in advance, based on the following questions:

- what are the key research issues?
- what are the gaps in the evidence base for actions?
- what are the restraints?
- what ethical approval will be required and how will it be obtained?
- how can funding be mobilised quickly?

5.9 International Issues

A pandemic is, by definition, an international event. The UK must keep abreast of international developments and thinking. It also has certain international obligations (in particular in respect of the World Health Organization and the European Union) to report disease incidents and outbreaks and the actions we are taking. The UK will play its full part in contributing data, knowledge and expertise to help towards a co-ordinated and coherent international response. Where possible the UK will also deploy personnel to join response teams assisting third countries with their response.

6. Who does what – the roles and responsibilities of the main organisations contributing to the response

This section outlines the roles and responsibilities of key organisations with particular emphasis on the roles and responsibilities of the UK Health Departments working together within a UK framework in which the Department of Health (England) has the lead. The Plan recognises that some Government functions (including health) are devolved or partly devolved, while others are not, and that organisational structures and responsibilities differ in England, Scotland, Wales and Northern Ireland.

All organisations should have preparedness plans in place, covering their own part of the response and their business continuity arrangements, based on the advice in this document but consistent with other relevant contingency plans.

6.1 The UK Health Departments

- Department of Health (England) (DH)
- Scottish Executive Health Department (SEHD)
- National Assembly for Wales – Office of the Chief Medical Officer (OCMO) and the Health and Social Care Department
- Northern Ireland Department of Health, Social Services and Public Safety (DHSSPS)

The Department of Health (England) has the overall UK lead, and retains some specific UK-wide responsibilities, but all four Health Departments will work in close collaboration to ensure a coherent and co-ordinated UK-wide response. The Department of Health will work closely with the UK Health Departments in Devolved Administrations to ensure this overarching Plan is consistent with their organisation, structures and responsibilities.

6.2 The role of the Department of Health

UK-wide role: Direction and co-ordination of the UK health response

The Department of Health has overall responsibility for planning, initiation, direction and central co-ordination of the UK health response. It will take full account of devolved responsibilities in providing the overall UK lead to:

i. develop and ensure ongoing revision of the overall UK Health Departments' Pandemic Plan

ii. improve preparedness across all health systems, UK-wide

iii. oversee implementation of the plan

iv. provide policy direction for the public health response and develop strategies to reduce the impact on the health of the UK population, drawing on the appropriate advisory machinery

v. brief Ministers

vi. provide the information and guidance UK Health Departments, Government Departments and Agencies and other organisations need to plan and respond appropriately at national, regional and local levels

vii. provide the necessary health input to the national civil contingency response through the Civil Contingencies Committee, and

viii. provide UK input to the international response, in particular through WHO and the EU, and liaise internationally through its formal channels.

Other specific roles of the Department of Health

DH, in partnership, and liaising closely with the other UK Health Departments and other organisations (indicated in brackets), will:

- facilitate, as far as it is able, the development and licensing of a pandemic vaccine
- secure supplies for the UK of an effective vaccine, antiviral agents, antimicrobials and other pharmaceutical products and other essential supplies eg face masks, surgical gloves etc, if required (with PASA, NHS Logistics, NIBSC, HPA, manufacturers)
- develop strategies and priority groups for use of vaccine and use of antiviral agents (advised on vaccines by the Joint Committee on

Vaccination and Immunisation (JCVI) and NICE and other experts for antivirals)

- control, on a UK basis, the issue of vaccine, antivirals and antimicrobials (PASA)
- monitor adverse reactions in the UK to vaccines and drugs (MHRA)
- co-ordinate provision of consistent, accurate advice to health professionals, managers, the public and the media (HPA, with HPS)
- agree research protocols with DH Research and Development Division (RDD), HPA, the Medical Research Council (MRC) and other research bodies which can be activated in the event of a pandemic
- liaise with international agencies e.g. WHO and the European Union, including over the worldwide distribution of vaccine and antivirals
- negotiate for additional resources if necessary for the overall UK response and for the NHS in England (Treasury)
- establish a central DH team to respond rapidly when the time comes (DH Recovery and Support Unit) to carry out the UK and England only functions and to liaise with equivalent Health Department teams in the Devolved Administrations
- collate and produce a report after the event (HPA/ONS).

England only role: co-ordination of the public health and NHS response in England

Additionally, the Department of Health (England) will co-ordinate the public health and health service response in England.

6.3 The UK National Influenza Pandemic Committee (UKNIPC)

The Department of Health (England), in consultation with the other UK Health Departments, will appoint a UK National Influenza Pandemic Committee (UKNIPC) to advise all four Health Departments on the UK response. Its composition and remit are at Annex A. The UKNIPC membership includes representatives from the Health Departments of the Devolved Administrations. The UKNIPC will be supported by an Executive at working level of DH and HPA officials representing the relevant work areas and led by a Co-ordinator who will assume overall accountability for the organisational arrangements and the NHS

response in England. The UKNIPC will be convened by DH to assist its planning, or in the event of a potential or actual pandemic. The Department of Health will also appoint a Scientific Advisory Committee to provide specialist scientific advice.

6.4 The Civil Contingencies Committee and Civil Contingencies Secretariat

At a UK level the Civil Contingencies Committee (CCC), with the support of the Civil Contingencies Secretariat (CCS), provides the central focus for cross-departmental and cross-agency commitment, co-ordination and co-operation to enable the UK to deal effectively with disruptive challenges and crises. CCC will work alongside equivalent committees in the DAs who are responsible for co-ordinating their part of a response to a pandemic.

As the consequences of a pandemic and control or other measures have implications for Departments and agencies other than the Health Departments, the CCC will co-ordinate strategic decision making on UK national priorities across Departments and with Devolved Administrations to ensure an integrated UK response. This will be indicative of a major ratcheting up of the response and will lead to significantly increased interaction between the Health Departments, the Health Protection Agency and Health Protection Scotland and the CCS, with increased information flow and downward tasking. The CCS will gather information from DH, all other Departments and Devolved Administrations for a daily situation report (SITREP). Devolved Administrations will gather information in their own countries which they will share with CCS.

6.5 Other Government Departments

The following Government Offices and Departments will be directly or indirectly involved in the response to an influenza pandemic, or will have client groups who need advice and/or need to be kept informed (eg utilities, schools, colleges, business and transport):

- Department for Education and Skills (DfES)
- Department for Environment, Food and Rural Affairs (Defra)
- Department for International Development (DfID)
- Department for Media, Culture and Sports (DCMS)
- Department of Trade and Industry (DTI)

- Department for Transport (DfT)
- Food Standards Agency (FSA)
- Foreign and Commonwealth Office (FCO)
- Government Offices of the Regions (England) (GO)
- Home Office (HO) (mass fatalities lead)
- Ministry of Defence (MoD)
- Office of the Deputy Prime Minister (ODPM)
- Office of Science and Technology (OST)
- The Veterinary Laboratory Agency (VLA) and State Veterinary Service (SVS)
- Cabinet Office

Other Government Departments will be consulted either directly, or via the collective decision making mechanism provided by the Civil Contingencies Committee before any actions are agreed or taken that will impact on their sector or area of business, and would provide assistance with any discussions with their sectors over health measures required.

6.6 Devolved Administrations

The Devolved Administrations are responsible for:

- policy and planning within their administrations
- ensuring their own capacity and capability to respond
- oversight of their national and health service response
- co-ordination of the civil contingency response and their country's Health Departments.

Health Departments and Office of the Chief Medical Officer (Wales): Direction and co-ordination of the response in the Devolved Administrations

Health Departments in Scotland and Northern Ireland and the Office of the Chief Medical Officer and Health and Social Care Department in Wales have responsibility in Scotland, Northern Ireland and Wales for

planning, initiating, directing and centrally co-ordinating the health response in the Devolved Administrations, working within a UK context where the Department of Health (London) leads. Health Departments of Devolved Administrations take the lead to:

- work with the Department of Health (England), on the development and ongoing revision of the UK Influenza Pandemic Plan and the detailed implementation plans for the Devolved Administrations
- improve preparedness across all health systems in the Devolved Administrations and provide advice to other devolved areas where appropriate
- provide a policy direction for the public health response in the Devolved Administrations and develop strategies to reduce the impact on the health of their populations working within the context of the overall UK public health response
- brief Ministers in their administrations
- provide information and guidance to other Departments and Agencies in the Devolved Administrations and other involved organisations, to enable them to make their own plans and respond appropriately, working within the UK framework
- provide the necessary health input to the civil contingency response in Devolved Administrations through their Co-ordinating Committees
- contribute to the international response through DH, who will lead on international issues through WHO and EU
- co-ordinate the response of the NHS in Scotland, Wales and Northern Ireland to provide the best possible treatment and care for those affected and provide information and guidance to the NHS in Devolved Administrations to enable the service to make plans working within the UK framework.

Devolved Administrations will each send a representative to the UK National Influenza Pandemic Committee (UKNIPC) which advises all four UK Health Departments. They will also appoint their own Committees to provide strategic implementation advice on health issues and co-ordination of the health response in Devolved Administrations working within the overall UK framework set by UKNIPC

Other specific roles of Devolved Administrations

The following responsibilities will be undertaken by the health departments working with the Department of Health (England) and advised by UKNIPC on overall UK issues and by the Devolved Administrations' committees on strategic implementation issues for the Devolved Administrations. Working within an overall UK context and in partnership with other organisations (indicated in brackets):

- liaise with the Department of Health to secure supplies for Devolved Administrations of an effective vaccine, antiviral drugs, antimicrobials and other pharmaceutical products and other essential supplies, eg face masks, surgical gloves
- ensure an effective distribution mechanism, for supplies of vaccine and antivirals within Devolved Administrations
- acting on JCVI advice determine strategies and priority groups for vaccination in discussion with other Health Departments, and develop strategies and priority groups for use of antivirals advised by and NICE other relevant experts and in discussion with other Health Departments
- control the issue of vaccine, antivirals and antimicrobials in Devolved Administrations
- ensure monitoring of adverse reactions to drugs and vaccines by MHRA
- co-ordinate provision of consistent, accurate advice to health professional, managers, the public and media in Devolved Administrations. (HPA/HPS)
- negotiate for additional resources, if necessary, for the response of the Devolved Administrations and for the NHS in their countries
- establish central health department teams to respond rapidly, liaise with DH and support Devolved Administrations implementation committees
- collate and produce a report for after the event and contribute to overall UK report.

Co-ordination and Resilience in Devolved Administrations

Devolved administrations are responsible for co-ordinating the civil contingency response in their areas. Co-ordinating Committees provide the focus for cross-sectorial commitment, co-ordination and co-operation to enable them to respond effectively to disruptive challenges and crises. These committees co-ordinate with the CCC through their Ministers.

6.7 English Regions

In England, Regional Directors of Public Health (RDs PH) will ensure a 24 hour capability to support both Strategic Health Authorities and the rest of the Department of Health, and where necessary will co-ordinate public health resources in responding to public health emergencies. RDsPH provide the health link with other regional Government Departments and to Regional Resilience mechanisms, and chair Regional Civil Contingencies Committees in public health emergencies to maintain an overview of regional impacts and response and report into CCC at national level.

6.8 The Health Protection Agency (HPA)

The HPA is the lead agency responsible for advising and supporting the UK national public health response to major infectious disease incidents and outbreaks, acting through its component parts:

- the Centre for Infections(CFI), Colindale
- the Centre for Emergency Preparedness and Response (CEPR), and
- Local and Regional Services (LaRS) (England only).

Health protection organisations in the Devolved administrations, although not directly equivalent, are:

- in Scotland, Health Protection Scotland (HPS)
- in Wales, The Wales National Public Health Service (PHS)
- in Northern Ireland, The Communicable Disease Surveillance Centre, NI.

If the epicentre is in one of the Devolved Administrations rather than in England, the equivalent health protection organisation will be in the lead for the immediate incident or event, but the HPA will still be expected to play its UK co-ordinating role.

The HPA will, where appropriate in co-ordination with colleagues in the health protection organisations in the DAs, will:

- liaise with WHO and other international agencies
- provide specialist public health advice together with operational and investigative support, to DH, the NHS in England, English Regional Public Health Groups and others with formal responsibilities for dealing with pandemic influenza
- provide a co-ordinated UK national public health response
- provide reference virological and microbiological services for the UK
- characterise strains of influenza virus isolated in the UK, both through routine and structured sampling
- assess and monitor antiviral susceptibility
- if indicated, assess antibody status of a sample of the population
- assess the spectrum of secondary bacterial infections complicating influenza and their antimicrobial susceptibility and make recommendations to incorporate into clinical guidance
- lead the laboratory investigation of samples, arrangements for laboratory testing and development of a strategy for escalation
- co-ordinate national influenza surveillance: obtain and analyse information on national and international influenza activity (including laboratory, clinical and mortality data) and distribute it on the HPA website, in a weekly, or more frequent, influenza bulletin
- provide virological and epidemiological data on which UK national decisions, such as the choice of vaccine strategy and use of antiviral agents, must be based
- co-ordinate development of UK national guidelines for health professionals
- monitor vaccine uptake, when vaccine becomes available
- in England, through local Health Protection Units, co-ordinate the local public health response, support NHS Trusts and local authorities in their response and ensure cross linkages between HPUs and NHS units are specified in local plans

- provide specialist emergency planning advice to DH, the NHS (England) and English Regional Directors of Public Health.

6.9 Health protection organisations in the Devolved Administrations

Health Protection Scotland, the Wales National Public Health Service and the Communicable Disease Surveillance Centre Northern Ireland, working with HPA, will:

- participate in HPA-led UK arrangements to ensure as far as possible a consistent UK-wide public health response
- co-ordinate and communicate influenza surveillance in the DAs and provide HPA with timely data to produce UK surveillance data
- provide specialist advice to the Office of Chief Medical Officer/Health Departments of the DAs
- provide scientific, operational and logistical support to the NHS in DAs on public health management
- co-ordinate the implementation of the public health response by their local health protection organisations

6.10 The Health Service

The National Health Service (NHS)

In England:

- Strategic Health Authorities (SHAs)
- NHS Trusts (Primary Care, Acute Hospital, Ambulance, Mental Health)
- NHS Direct

In Scotland:

- NHS Boards, their Operating Divisions and Community Health Partnerships (CHPs)
- NHS Special Health Boards (Scottish Ambulance Service, NHS National Services, Scotland)
- NHS 24 Scotland

In Wales:

- Local Health Boards
- Wales Ambulance and Hospital Trusts
- Wales National Public Health Service
- NHS Direct Wales

In Northern Ireland:

- Health and Social Services Boards
- Acute, Community and Ambulance Trusts

The independent hospital and nursing home sector

The independent health and social care sector will be affected, and will need to be involved in planning at all levels of response.

Roles of health organisations

At strategic level (Strategic Health Authorities in England, NHS organisations in each of the three health regions in Wales, relevant Health Boards in Scotland), Health Service organisations are responsible for:

- strategic control of any incident that affects or seems likely to affect a number of hospitals or have a significant impact on primary care
- ensuring command and control structures are in place across the NHS within its area and have been tested
- agreeing with HPA/HPS and the RsDPH/DsPH in devolved administrations escalation triggers and mechanisms
- ensuring escalation policies are clearly described, and that capacity plans are available
- ensuring links within the NHS, with neighbouring SHAs, Health Regions or NHS Boards, with RsDPH/DsPH in DAs, the HPA/HPS and across into the other sectors – including social care – are effective and durable
- ensuring local provision for an influenza pandemic
- monitoring the plans of NHS organisations within its area

- they may have to clarify which routine NHS targets can be dropped or modified, ie what business will not be continued 'as usual' in the event of a pandemic disrupting normal work.

In addition, all NHS Organisations should have contingency plans which cover:

- the command and control structure, escalation policies and links to other sectors
- arrangements to appoint a named influenza co-ordinator, normally the Director of Public Health, and a pandemic planning committee with appropriately wide representation
- to routinely report data required by HPA and DH on a pandemic and its impact on the health service
- arrangements for the optimum care for those affected, including ability to mobilise and direct health care resources to local hospitals at short notice to support them and to sustain patients in the community should hospital services be reduced or compromised for a period
- ensuring they have the appropriate facilities for infection control
- arrangements for liaison with Local Authority colleagues and Social Services, including coherence of emergency plans and joint working
- arrangements to have mutual support arrangements between neighbouring NHS organisations
- arrangements to decide which routine NHS work can be dropped or modified, ie what business will not be continued as usual. These arrangements should include appropriate bodies with lay representation to debate and agree in public difficult rationing decisions
- managing the disruption caused by influenza on other NHS services and other medical conditions
- contingency staffing arrangements for primary, acute and public health services
- arrangements to cope with staff absenteeism and increased patient loads
- arrangements to provide antiviral treatment and to immunise essential

staff according to UK guidelines

- plans for emergency vaccination programmes according to UK guidelines, including an estimate of local vaccine and antiviral needs and arrangements for ensuring the vaccine and antivirals are distributed and administered appropriately
- communication arrangements to healthcare professionals, the public and media, including timely cascade of information from national and international sources
- arrange to have laboratories investigate influenza like illness, isolate strains of influenza, test antimicrobial susceptibility of secondary bacterial infections and report findings for local and UK surveillance according to UK-wide agreed protocols
- ambulance Trusts/Special Health Boards may need to consider central co-ordination of all patient transfers during Phase 6 of the response
- staff training
- a media handling strategy.

NHS Direct,NHS Direct Wales and NHS 24 in Scotland are responsible for developing and maintaining up to date advice algorithms for influenza, with HPA and others, and activating them when instructed by the HPA or the Department of Health (England). They will be expected to share algorithums.

6.11 Other local level organisations

Key agencies, including local authorities, the police and voluntary sector will need to meet to consider local issues relating to the pandemic. Key agencies will usually meet as part of the local resilience committee or strategic co-ordinating group (SCG) or 'Gold (Strategic) Group'). In England, local Directors from Health Protection Units may be asked to chair the local resilience committee/SCG for the duration of the outbreak. Public health staff may be asked to undertake a similar role in the devolved administrations.

6.12 Other key organisations

The WHO Collaborating Centre for Influenza at the National Institute for Medical Research (NIMR) will:

- contribute to international surveillance of influenza viruses by determining the antigenic characteristics of strains of influenza virus received from countries world-wide
- as a result of personal contacts with laboratory workers in other countries and its WHO role it will hear of the appearance of a new strain at the earliest stage and obtain isolates for further characterisation which may be suitable for vaccine production
- collaborate with NIBSC over potential vaccine candidate strains
- collaborate with the National Reference Laboratory in testing the antiviral susceptibility of isolates
- improve and maintain links with national influenza laboratories in other European countries.

The National Institute for Biological Standards and Control (NIBSC) will:

- produce and distribute candidate vaccine strains, including high growth reassortants (hgr), and vaccine potency reagents for standardisation and research
- liaise with vaccine manufacturers and other control laboratories and advise DH, WHO and the EC on vaccine strains
- assess the serological response to immunisation
- advise DH on licensing issues
- batch release influenza vaccines.

The Medical Research Council has a coordinating role for research, for example for clinical trials of new vaccines and anti-viral agents, and for setting up collections of samples of clinical material or isolates for storage for later investigation.

The RCGP Research Unit, CDSC Wales and Northern Ireland and Health Protection Scotland

- monitor new consultations for influenza-like illness and other respiratory infections in primary care through sentinel practice

reporting schemes. In England and Wales, reports are also aggregated by 'region', ie North, Central and South

- contribute to virological surveillance through structured surveillance
- contribute to monitoring vaccine uptake.

The UK Vaccines Industry Group (UVIG) and the ABPI

Liaison with the vaccines and pharmaceuticals industry is key to development and supply of vaccine and other pharmaceutical supplies.

6.13 International bodies

The World Health Organization

Through its Global Agenda on Influenza, the WHO co-ordinates the international response to a potential or actual influenza pandemic, with particular emphasis on:

- Co-ordination of international surveillance

National Influenza Reference Centres in 83 countries, including the UK, submit the results of their own surveillance to one of four WHO Collaborating Centres (Atlanta, London, Melbourne and Tokyo).

- Advice and recommendations for pandemic planning, particularly strategies for public health interventions
- Provision of expert field assistance to Member States on request (including provision of field response teams)
- Co-ordination of international investigations and responses
- Provision of international information and advice to health authorities, the media and the public

The European Union

The European Commission

- Assists the exchange of information between Member States through the European Network for the Epidemiological Surveillance and Control of Communicable Diseases (the 'European Network') and its Early Warning and Response System (EWRS)

- Co-ordinates Member States responses through the European Network and other mechanisms
- Prioritises European research funding.

In future the co-ordination function is likely to be provided by the European Centre for Disease Prevention and Control.

7. Phase by phase actions

The UK response follows the WHO phases outlined in chapter 3. This chapter sets out the action to be taken by different organisations at each phase. At each stage, WHO will inform the Department of Health of the increased alert level. The Department will communicate this information, together with an assessment of the risk to the UK, to healthcare professionals, the public and relevant organisations. The actions outline a proportionate response to the level of risk posed at each phase.

Once the pandemic virus has emerged, and the WHO have announced the start of a pandemic, actions have been set out to correspond with the UK alert levels. It is recognised that there may be a very short time period between the virus first emerging internationally, it arriving in the UK, and becoming widespread in this country.

The interpandemic period – Phases 1 & 2

Phase 1: No new influenza virus subtypes detected in humans

Phase 2: No new influenza virus subtypes detected in humans. Circulating animal influenza virus subtype poses a substantial risk of human disease

Planning assumptions
- WHO will inform DH of any change of phase
- Seasonal influenza will be the major focus of attention
- A new virus is most likely to emerge in the Far East
- WHO will have the lead for investigating any such events with the UK contributing effectively

Priorities
- Improving knowledge and management of seasonal influenza
- Maintaining vigilance over international surveillance (including animal/bird influenza surveillance)
- To be in a position to identify a novel virus promptly should one occur in the UK
- Improving preparedness across all sectors
- Liaison with animal health colleagues

Main capabilities required
- Clinical and animal surveillance and laboratory diagnostic capabilities to recognise and provide warning of a new virus with pandemic potential from human (and animal) specimens
- Virological diagnostic capability

Actions

DEPARTMENT OF HEALTH, IN COLLABORATION WITH HEALTH DEPARTMENTS OF DAS

Leadership, organisation and co-ordination

- set and regularly review national policy for annual influenza immunisation, advised by JCVI, and maintain an effective annual influenza programme
- keep UK national influenza pandemic contingency plans up to date, and improve UK preparedness, working with each other and other organisations
- indicate the membership for the pandemic influenza committee and scientific advisory group
- name a pandemic co-ordinator
- issue information to inform planning for other Government Departments, the NHS and other relevant organisations to assist the development of their own contingency plans
- consider workshops to discuss implications of a pandemic for other organisations
- provide UK input to pandemic planning at international level, including the EU
- *Phase 2* – liaise with Defra over implications for human health

Communications

Strategic

- Agree pandemic communication needs, strategy and structure

Professional

- Maintain annual letter on national influenza immunisation programme to healthcare professionals

The public and media

- Maintain routine information on seasonal flu and flu immunisation for the public via leaflets, posters, NHS Direct and its equivalents and websites

- Increase awareness of seasonal flu and flu immunisation policy through media campaigns
- Use opportunities to prepare and inform the public about pandemic influenza
- Prepare draft pandemic information, frequently asked questions etc for the public which can be issued as necessary
- Maintain a UK-based WHO Collaborating Centre with a capability and capacity to contribute effectively to WHO's Global Influenza Surveillance Network

Vaccine development

- Support development of improved influenza vaccines
- Optimise preparedness for pandemic vaccine production in discussion with vaccine manufacturers including
  - Technical aspects
  - Regulatory aspects (MHRA lead)

Immunisation policy

- Maintain and improve influenza and pneumococcal immunisation programmes
- Develop policy for immunising poultry workers in the event of an avian influenza outbreak
- Consider maintaining a small stockpile of the annual influenza vaccine for use should an outbreak of highly pathogenic avian influenza occur in poultry in the UK
- Establish policy options and implementation methods for pandemic immunisation
  - Plan for monitoring uptake and possible adverse reactions

Antiviral strategy

- Agree options for use of antivirals
- Plan monitoring of effectiveness and possible adverse reactions

Other measures for reducing spread

- Identify other strategies, work out wider implications and outline implementation plans

The health response

- Estimate pharmaceutical supply needs and consider supply issues (with PASA)
- Prepare operational guidance for the NHS

Cross Government and Civil Contingencies response

- Consider implications for all Government Departments

Research

- Identify priorities for research, particularly
- mathematical, epidemiological and operational modelling to inform planning
- to support vaccine development
- to support other public health/social interventions
- Discuss research needs with relevant stakeholders in the event of a pandemic and develop and maintain research protocols to implement during the pandemic

THE HEALTH PROTECTION AGENCY, IN COLLABORATION WITH HEALTH PROTECTION ORGANISATIONS IN THE DAS

- maintain and regularly review operational aspects of the annual influenza programme
- advise the Department of Health (England) on control policies for seasonal and pandemic influenza
- develop HPA operational response plans applicable to a pandemic across all its Divisions
- *Phase 2* – maintain liaison with WHO and advise DH on risk to human health
- *Phase 2* – develop and maintain algorithm for management of patients with suspected avian flu

Surveillance

- Maintain and regularly review routine national clinical and virological influenza surveillance, co-ordinated across the UK
- Contribute to WHO and European influenza surveillance schemes
- Maintain close links with WHO surveillance
- Ensure that significant infection events abroad, for example outbreaks of unexplained respiratory illness or outbreaks of avian influenza infection in poultry flocks, are recognised, sufficient detail is obtained for assessment and the threat posed to the UK is monitored
- Improve regional coverage and data on hospital admissions
- Investigate outbreaks of influenza, particularly if related to travel to the Far East
- Alert clinicians to incidents/outbreaks which could be linked to a new strain and the actions they should take
- Monitor influenza and pneumococcal vaccine uptake

Microbiology and virology

- Maintain reference capability and capacity to monitor prevalent viruses and their antiviral resistance
- Improve and standardise NHS laboratory investigation of influenza-like illness, including identification of influenza viruses and protocols for referring isolates/specimens to the National Influenza Reference Laboratory
- Maintain structured virological surveillance linked to clinical surveillance
- Optimise laboratory capability and capacity to identify a novel virus and monitor antiviral resistance
- Collaborate with animal health colleagues on laboratory methods/ surveillance
- Collect data on bacteria complicating influenza and their antimicrobial susceptibility

- *Phase 2* – develop diagnostic capability for new virus with animal health colleagues.

Clinical guidance

- Draft outline clinical management guidelines (HPA with professional organisations)
- Draft outline infection control guidelines (HPA with the Health and Safety Executive)

HEALTH ORGANISATIONS

- maintain an annual influenza immunisation programme according to national policy, including maintenance of 'at risk' patient registers
- ensure local contingency plans applicable to seasonal and pandemic influenza are kept up to date and make local organisation and accountability clear
- initiate discussions with relevant local stakeholders on preparedness for an influenza pandemic
- consider exercises to test local plans.

Manpower, education and training

- Address implications for staffing
- Plan recruitment and training
- Consider training exercises

NIBSC/NIMR/HPA NIRL

- Contribute to WHO meetings to advise on the strains to be used for vaccine production each year

The Pandemic alert period

Phase 3: Human infection(s) with a new subtype, but no new human-to-human spread, or at most rare instances of spread to close contact

Planning assumptions

- WHO will inform DH of change of phase
- A single human case of avian flu outside the UK still represents a very small risk to the UK. However, closer vigilance will be required if it is associated with significant outbreaks of avian influenza in poultry, particularly if geographically close to the UK
- A single human case of avian flu within the UK requires full investigation, containment and a risk assessment

Priorities

- Maintaining close liaison with international organisations such as WHO and with animal health colleagues
- Assisting with identification of the virus and its characteristics
- Re-assessing pandemic preparedness and identifying actions needed to fill the gaps

Main capability required:

- Diagnostic capability for the new virus
- To recognise illness potentially due to a new strain in people in the UK, confirm it virologically and investigate the possible source.

Actions

DEPARTMENT OF HEALTH, IN COLLABORATION WITH HEALTH DEPARTMENTS OF DAS

Leadership, organisation and co-ordination

- Review UK contingency plans
- Continue to assess preparedness and fill any gaps
- Liaise with Defra and other Government Departments as necessary over wider implications

Communications

Strategic

- DH will assess risks based on information from WHO and HPA and inform relevant organisations, involving Defra as necessary if associated with animal/avian influenza

Professional

- Consider need for information and/or guidance

Public and media

- Consider the needs of stakeholders and media
- If outside UK, consider the need for information for websites and prepare and issue travel advisories as appropriate in conjunction with FCO and the National Travel Health Network and Centre
- Consider background briefing of specialist health and science correspondents.
- Ensure phone lines adequate for any future public/media information lines
- Prepare near-ready materials, including Q&As

Vaccine development

- Consider what possible existing candidate vaccines or vaccine strains may be available should the need arise
- Liaise with NIBSC over possible vaccine development plans

Public health response

- If outside the UK, consider strategies to prevent the spread of infection to the UK from affected areas should the need arise
- Consider plans for use, distribution and access to antiviral drugs

The civil contingency response

- CCS maintains a watching brief
- Work with other Government Departments to consider impact of a pandemic on their sectors

HPA

- Develop preparedness plan for the Agency
- Maintain and update algorithm for management of patients with suspected avian flu

- Maintain infection control guidelines and clinical management guidelines, updating as required

Surveillance

If in the UK

- Exclude laboratory error or artefact
- Collect information on possible source of infection and contacts
- Monitor contacts
- Assess antibody levels in contacts

Outside UK

- Consider heightening surveillance as indicated by circumstances of the case, for example country of origin, other related infections, connections with the UK

Microbiology and virology

- Prepare reagents for identification of the new strain
- If in the UK, assess pathogenicity, antiviral susceptibility and other characteristics
- Ensure timely laboratory diagnosis available regionally and centrally

Public health control measures

- If in the UK, manage the case and contacts on the principles of investigation, surveillance and containment, using antiviral drugs for treatment and prophylaxis of immediate contacts as indicated

NIMR/NIBSC/HPA

- NIMR (WHO Collaborating Centre) continues to identify and monitor international viruses
- NIMR/NIBSC/NIRL contribute to international consultation (led by WHO) on assessment of the pandemic potential

HEALTH SERVICE ORGANISATIONS

- If in the UK, follow HPA algorithm for the management of suspected cases of avian flu. If diagnosed within 48 hours, consider

appropriateness of antiviral treatment of the case plus prophylaxis for close contacts who may have been infected

- Consider infection control measures appropriate for a flu pandemic
- Exercise and test local NHS plans with relevant stakeholders

Phase 4: Small cluster(s) with limited human-to-human transmission but spread is highly localized, suggesting that the virus is not well adapted to humans

Planning assumptions

- WHO will inform DH of change of phase
- Cases of avian flu in people outside the UK are still likely to present a small risk to the UK; the risk increases if there are many cases and strong travel links to the UK or in a geographically close country.
- If cases are associated with widespread avian influenza outbreaks, the risk of further cases increases, especially if control measures are thought to be late or inadequate
- The longer such outbreaks continue, the greater the concern
- If within the UK, report to WHO. Prompt investigation and assessment of risk is required

Priorities

- Assisting identification of virus and its characterisation
- Assisting international investigation
- If associated with avian/animal influenza, close liaison with animal health colleagues
- Review pandemic plans
- Preliminary assessment of potential candidate vaccine strains

Main capability required

- If in the UK: ability to identify related cases of influenza in people due to the new strain suggesting person to person spread

Actions

DEPARTMENT OF HEALTH, IN COLLABORATION WITH HEALTH DEPARTMENTS IN DAS

Leadership, organisation and co-ordination

- Review UK pandemic plan
- Continue to assess preparedness and fill any gaps

- Liaise with Defra and its equivalent in Scotland over any implications for poultry in the UK

International

- Support and assist international outbreak investigation and response and characterisation of the virus and the disease epidemiology as national situation allows

Communications

Strategic

- DH will assess risks based on information from WHO and HPA and inform relevant organisations. Ensure mechanism in place for rapid assessment of risk should circumstances change

Professional

- Continue to enhance professional awareness as appropriate

Media/public

- If in the UK: issue statement on a regular basis, put information on web and provide briefing to NHS Direct (and its equivalent organisations)
- If outside UK, consider the need for information for websites and prepare and issue travel advisories as appropriate in conjunction with FCO and the National Travel Health Network and Centre

Public health response

- Finalise plans for use, distribution and access to antiviral drugs

The civil contingency response

- Continue to work across Government to ensure all sectors are developing contingency plans

HPA

Surveillance

Cases only outside the UK

- Prepare plans to enhance surveillance to identify clusters/outbreaks, particularly among communities with travel contact with site of initial identification of virus

If in the UK

- Obtain full details of circumstances and contacts
- Work with WHO to enhance surveillance and diagnosis and organise special investigations to increase understanding of the possible transmission and impact of the new virus
- With WHO, develop case definition for use in surveillance
- With WHO, consider assessment of prevalence of antibody to the new virus (serological surveillance)

Microbiology and virology

- In the UK: assess virus strain for antiviral susceptibility

Clinical

- Outside the UK: assess emerging information from use of drugs
- Review treatment protocols

Other public health measures

- If in the UK: continue containment strategy of previous phase; identify close contacts of cases

NIMR/NIBSC/HPA

- NIMR (WHO Collaborating Centre) continues to identify and monitor international viruses
- NIMR/NIBSC/NIRL contribute to international consultation (led by WHO) on assessment of the pandemic potential

Vaccine development

- In collaboration with WHO, develop and evaluate candidate virus strains for a vaccine against the novel strain
- Develop reagents to determine identity and potency of vaccines
- Conduct clinical trials of potential vaccines as they become available
- Consider work to develop a specific vaccine
- Test investigational lots of vaccine
- Discuss shelf life of potential vaccines with manufacturers

HEALTH SERVICE ORGANISATIONS

If in the UK

- If hospitalised, treat patients in single rooms with full infection control measures
- Follow HPA algorithm for the management of suspected cases of avian flu. If diagnosed within 48 hours, consider appropriateness of antiviral treatment of the case plus prophylaxis for close contacts who may have been infected
- Ensure local plans have been tested in exercises and continue testing programme with relevant local stakeholders

Phase 5: Large cluster(s) but human-to-human spread still localized, suggesting that the virus is becoming increasingly better adapted to humans, but may not yet be fully transmissible (substantial pandemic risk)

Planning assumptions
- WHO will inform DH of change of phase
- Risk to UK now significantly increased

Priorities
- Putting organisational arrangements in place
- Vaccine development
- Review of antiviral supply
- International co-ordination of actions

Main capability required
- To monitor clinical and virological spread

Actions

DEPARTMENT OF HEALTH, IN COLLABORATION WITH HEALTH DEPARTMENTS IN DAS

Leadership, organisation and co-ordination

- Convene the UK National Influenza Pandemic Committee to review all information related to the potential pandemic and advise on the response
- If it becomes apparent that the new virus is not spreading widely in the world, the UKNIPC will be stood down and the relevant organisations informed accordingly. Some activities will continue on a precautionary basis

- Consider establishing DH major incidents coordination centre and the corresponding operations rooms in DAs
- DAs will send representatives to the UKNIPC and convene strategic implementation committees in DAs

Communications

Strategic

- DH will assess risks based on information from WHO and HPA and inform relevant organisations as appropriate

Professional

- Issue initial information to health professionals with an assessment of the significance and advice on access to website guidance
- Distribute information about the immunisation strategy as appropriate

Public and media

- Public communications to include information about the immunisation strategy as appropriate to manage public expectations of vaccine
- Prepare and issue travel advisories as appropriate in conjunction with FCO and the National Travel Health Network and Centre
- Regularly update briefing for NHS Direct/NHS Direct Wales/NHS24
- Provide regular briefings for media
- Consider the needs of special groups eg FCO staff and other UK nationals in affected areas, community groups with links to affected areas, educational establishments

Vaccination strategy

- Contribute to WHO and European consultations on appropriate use of vaccines in different regions

Vaccine supply and delivery

- Finalise vaccine supply requirements
- Liaise with vaccine manufacturers over production plans
- Discuss acceleration of vaccine production

- Start negotiating central purchase of vaccine

Implementation of immunisation

- Develop a framework for delivery of mass vaccination

Antiviral drugs and other supplies

- Liaise with antiviral manufacturers over accelerating antiviral supply
- Liaise with manufacturers on the availability of appropriate antibiotics

International

- Contribute personnel and materials to support international outbreak investigation and containment activities, as the national situation allows

HPA

- Implement its own preparedness plan and co-ordinate activity across its Divisions

Surveillance

- Collaborate with international organisations to assess epidemiology of the disease and efficiency of person to person transmission
- Implement plans to enhance national surveillance and identify suspect cases and/or introduction of a novel virus into the UK, including dissemination of WHO agreed case definition for surveillance purpose
- Provide interpretation of surveillance with careful interpretation to avoid spurious reporting of outbreaks
- Assess age distribution and risk groups for severe morbidity
- Consider need to assess antibodies in banked/recently collected sera

Microbiology and virology

- Develop and evaluate diagnostic tests against novel strain
- Ensure availability of diagnostic reagents for the virus
- Provide reference laboratory support to test clinical specimens for influenza and identify a novel strain
- Assess the antiviral susceptibility of the novel strain

Clinical guidance

- Review guidance on case management
- Review guidance on infection control procedures
- Advise, after consultation with CDSC Laboratory of Hospital Infection on the most appropriate management of pneumonia, liaising with the appropriate bodies in DAs

NIMR/NIBSC/HPA

- NIMR (WHO Collaborating Centre) continues to identify and monitor international viruses
- NIMR/NIBSC/NIRL contribute to international consultation (led by WHO) on assessment of the pandemic potential

Vaccine development

- NIMR obtains and prepares strains for possible vaccine manufacture, if necessary from colleagues overseas
- NIBSC and NIRL assess candidate vaccine strain(s)
- liaises with WHO, DH, NCLs and manufacturers
- Contribute to WHO expert group on development and clinical trials of vaccines
- Liaise with MHRA over licensing of new vaccines

Other public health interventions

- If in UK, implement intensive control measures (isolation of case(s), quarantine of contacts in addition to antiviral treatment of cases and prophylaxis for contacts)
- Investigate possible reservoirs of infection

HEALTH SERVICE ORGANISATIONS

- Review plans, based on gaps identified from exercises
- Be prepared to recognise investigate and treat potential cases according to the HPA algorithm on management of patients with suspected avian influenza

CIVIL CONTINGENCIES COMMITTEE AND CO-ORDINATING COMMITTEES IN DAS

- Prepare Horizon Scanning assessment of risk and preparedness
- CCC (if convened) considers preparedness across all sectors

PANDEMIC PERIOD

Phase 6: Increased and sustained transmission in the general population

The WHO has announced that an influenza pandemic has started. For UK purposes this phase is divided into:

Alert level 1: no virus isolated in the UK

Alert level 2: sporadic cases in the UK, ie new virus in the UK

Alert level 3: outbreaks or epidemics in the UK

Alert level 4: widespread activity in the UK, i.e. pandemic established in the UK

Planning assumptions

- WHO will inform DH of onset of pandemic
- From Alert level 2, it may take 2-4 weeks for the virus to become established in the UK and 7-9 weeks for activity to reach a peak
- Once Alert level 3 has been reached, there will be intense pressure on health and all other services for at least 6-8 weeks
- Pandemic flu vaccine unlikely to be available for first wave

Priorities

- Reduce the impact of a pandemic in the UK
- At alert level 2, surveillance and containment of cases
- At alert level 3, the full strategic response:
  - maintaining health and other essential services
  - Health and social care response, to provide treatment and care
  - Civil emergency response, to reduce social disruption
  - keeping everyone informed and maintaining morale
- Vaccine development, and implementation of immunisation strategy when vaccine available

Main capabilities required

- Surveillance adapted to inform treatment and planning
- Interventions to reduce the impact
- Health and social care response, to provide treatment and care
- Civil emergency response, to reduce social disruption
- Effective communications strategy

Actions

DEPARTMENT OF HEALTH, IN LIAISON WITH OTHER UK HEALTH DEPARTMENTS

Leadership, organisation and co-ordination

- Convene regular meetings of the UK National Influenza Pandemic Committee, Scientific Advisory Group, and technical and other advisory groups
- Convene strategic implementation committees in DAs
- Convene Civil Contingencies Committee and equivalent co-ordinating committees in DAs
- Establish DH major incidents coordination centre if not already activated, and central Health Department Operations Rooms in DAs
- Move staff from other areas to assist the DH and cross-Government co-ordination of the response
- Put in place a daily 'battle' rhythm

Cross government and civil contingencies

- Consider if and when to call a UK emergency
- Give clear guidance to ensure local co-ordination and leadership, drawing on local systems, processes and networks

Communications

Strategic

- Daily situation reports from HPA, DH and the NHS reviewed by DH and CCC
- Alert NHS organisations to UK Alert Phase, and ask them to activate activate their plans at UK Alert Phase 2.
- Exchange information with European colleagues
- Government News Coordination Centre activated to ensure coordinated media handling and response

Professional

- HPA continues to lead on updating clinical and other guidance in the light of emerging findings, including advice on:
  - clinical management
  - infection control procedures

Public and media

- All information and advice for the public regularly updated
- Regular press briefings
- Press telephone enquiry lines maintained
- Prepare and issue international travel advisories as appropriate in conjunction with FCO and the National Travel Health Network and Centre
- Issue advice and guidance to the public about treatment, infection control and related measures such as travel

Surveillance (HPA/HPS)

- Continue to monitor the course of the pandemic outside the UK
- Monitor course of the pandemic virus in the UK (UK Alert Level 2-4) including:
  - Occurrence and cause of complications
  - Deaths
- Distribute information via the bulletin CDR weekly, although when new information appears, inform labs and consultants in communicable disease control through web based technology
- Contribute to WHO and European clinical and virological surveillance to assess age/severity/sequelae/response to treatment
- Implement agreed additional data collections to assess impact eg absenteeism in some large organisations

Microbiology and virology

- Characterise new isolates
- In UK Alert Level 2, investigate local outbreaks/sporadic cases
- Collate antibiotic susceptibility and resistance patterns of bacteria complicating influenza
- Roll out diagnostic reagents to local NHS laboratories
- Continue to provide reference microbiology to monitor antigenic drifts in the virus and antiviral susceptibility

Public health response

- Identify particular problems eg disruptions of essential service,
- Consider extending data collection if appropriate

Antiviral drugs

- Ensure equitable distribution of antivirals
- Monitor use and supply
- Monitor efficacy and adverse reactions
- Review strategy for use as clinical data emerges, and when immunisation programmes commences

Immunisation

- According to availability of vaccine, implement immunisation strategy according to evolving circumstances and availability of vaccine
- Review advice on priority groups to be vaccinated in light of emerging clinical data.
- Monitor (with HPA and MHRA)
  - Feedback on emerging problems delivering the programme
  - Availability and use of vaccine
  - Vaccine uptake
  - Effectiveness of vaccine
  - Adverse reactions associated with vaccination

- Serological response to immunisation

NIMR/NIBSC

- NIMR (WHO Collaborating Centre) secures samples of the pandemic virus (via WHO)
- NIBSC
- produces high quality growth reassortants (hgr) from the pandemic virus
- distributes the hgr and/or pandemic virus samples to manufacturers and National Collaborating Laboratories (NCLs)
- liaiases with WHO, DH, NCLs and manufacturers
- liaise with MHRA over licensing of new vaccines

HEALTH ORGANISATIONS

- All health organisations to activate their Pandemic Influenza Plans
- SHAs in England and Boards in DAs report to DH/DA Health Departments on preparedness and prepare daily situation reports on the NHS in its area
- Devolved Administration Health Departments provide DH with information on the situation within their area
- Prepare to restrict hospital admissions to meet the expected increased demand for hospital beds (some contracts may need to be suspended).

Manpower, education and training

- Consider ongoing training needs of redeployed staff or staff who are likely to have to undertake other duties.

Clinical care

- Establish studies to monitor outcome of treatment

Organisation of services

- Provide daily SITREPS to DH
- In accordance with local plan

- consider bed and staffing availability
- advise on use of antivirals
- administer vaccine (if available)
- liaise with local authorities

END OF FIRST PANDEMIC WAVE

Planning assumptions
- This phase is assumed to refer to the end of the first pandemic wave in the UK
- Pandemic virus may still be circulating internationally

Priorities
- Returning systems and services to 'normality'
- Reviewing all aspects of the response and regrouping in light of the first wave experience
- Continued surveillance
- Preparation for next wave(s)

Main capabilities required
- Ability to pick up re-emergence (clinical illness and laboratory confirmation)

Actions

DEPARTMENT OF HEALTH, IN COLLABORATION WITH HEALTH DEPARTMENTS IN DAS

- Review response and report to DH/other Health Departments Departmental Boards
- with CCS, review response in terms of UK preparation for this and other emergencies

Communications

Strategic

- Inform WHO and the EU Early Warning System of any change in UK control measures

Professional

- Inform health professionals and the NHS that first wave considered over, but activity may be ongoing in other countries

Public and media

- Inform the public and media of the UK situation and any areas that might still be affected

Antiviral strategy

- Review antiviral use including efficacy and adverse events
- Review antiviral strategy, estimating future needs and replenishing stocks

Immunisation strategy (if appropriate)

- Review vaccine uptake and efficacy
- Consider duration of protection afforded by vaccine
- Review short and longer term adverse events from vaccine (MHRA)
- Estimate vaccine needs to complete immunisation programme and continue immunising in anticipation of second wave

Research

- Review the models
- Review research in place during the pandemic
- Review information needs for future waves
- Encourage collaborations, including international collaborations, over research on the pandemic and how it was handled

HPA

Surveillance

- Ensure systems are in place to detect possible re-emergence

Microbiology and virology

- Continue to monitor influenza viruses for antigenic 'drift' and advise on vaccine suitability
- Consider serological surveys to assess population immunity
- Restock laboratory reagents and equipment

HEALTH SERVICE ORGANISATIONS

- Put plans in place to resume business continuity
- Prepare for future wave(s)
- Consider future manpower, education and training

CROSS GOVERNMENT AND CIVIL CONTINGENCIES RESPONSE

- Consider actions needed to resume business continuity
- Prepare for future wave(s)
- Consider future manpower, education and training needs

SECOND OR LATER WAVES

Planning assumptions
- Pandemic virus may still be circulating internationally
- UK alert levels 1-4 may be relevant
- Pandemic virus may have evolved
- Impact may be less or even greater than first phase

Priorities
- Early detection of the second wave in the UK

Actions

Reactivation of Phase 6, Alert level 3, informed by experience of the first wave of the pandemic

POST PANDEMIC PERIOD – Return to interpandemic period

Planning assumptions

- This or a similar virus likely to remain in circulation
- It may take months or even several years for some national services to recover

Priorities

- Assessment and evaluation: review and revise plans

The UK National Influenza Pandemic Committee will prepare a report, reviewing the effectiveness of and lessons learned from the plan. The chairman will then decide if the Committee should be stood down.

All contingency plans should be reviewed in the same way in the light of experience during the pandemic.

Actions

- Assessment and evaluation across all sectors
- Returning to normal business continuity may take some time and recovery plans may need to be drawn up
- A communications strategy will need to accompany recovery plan

8. Sources of guidance

www.dh.gov.uk/pandemicflu

www.immunisation.nhs.uk

www.hpa.org.uk

www.who.int/csr

Avian flu

www.defra.gov.uk

www.oie.int

www.who.int/csr/disease/avian_influenza/chronology/en/

9. References

The next pandemic influenza virus? Shortridge KF. *Lancet* 1995; **346**: 1210-12

While awaiting the next pandemic of influenza A. Webster RG. *BMJ* 1994; **309**: 1179-80

The transmission of epidemic influenza. Hope-Simpson RE. 1992: Plenum Press

The influenza epidemic in England and Wales 1957-58. Ministry of Health Reports on Public Health and Medical Subjects No 100. 1960: London HMSO

Influenza in the world: period October 1969-March 1970. WHO. *WER* 1970; **45**: 409-428

Epidemiology of the Hong Kong/68 variant of influenza A2 in Britain. Miller DL, Pereira MS, Clarke M. *BMJ* 1971; **1**: 75-479P

National experience with Hong Kong influenza in the United Kingdom, 1968-69. Roden AT. *Bull WHO* 1969; **41**: 375-380

Serological evidence of infection with A2 Hong Kong influenza virus during the epidemic in Britain 1968-9. Pereira MS, Miller DL, Clarke. *BMJ* 1969; **4**: 815

Influenza viruses: Clinical spectrum and management. Nicholson K in *Viral and other infections of the human respiratory tract*. Myint S, Taylor-Robinson D eds. 1995. Chapman and Hall. ISBN 0 41260070 6

Clinical studies of monovalent inactivated whole cell virus and subunit A/USSR/77 (H1N1) vaccine: serological responses and clinical reactions. Nicholson KG *et al. J Biol Standard* 1979; **7**: 123-136

Antibody responses and reactogenicity of graded doses of inactivated influenza A/New Jersey/76 whole virus vaccine in humans. Pandemic Working Group of the MRC (UK) Committee in Influenza and other respiratory virus vaccines. *J Inf Dis* 1977; **136**: S475-83

Confronting the avian influenza threat: vaccine development for a potential pandemic. Stephenson I, Nicholson KG, Wood JM, Zambon MC and Katz JM. *Lancet Infec Dis* 2004; **4**: 499-509.

The economic impact of pandemic influenza in the United States: priorities for intervention. *Emerg Infect Dis 1*999; **5**: 659-71.

Avian influenza: assessing the pandemic threat. World Health Organization WHO/CDS/2005 29 January 2005.

The influenza vaccine licensing process. Wood JM and Levandowski RA. *Vaccine* 2003; **21**:1786-8.

The annual production cycle for influenza vaccine. Gerdil C. *Vaccine* 2003; **21**: 1776-9.

The origins of the 1918 pandemic influenza virus: a continuing enigma. Reid AH and Taubenberger JK. *Journal of General Virology* 2003; **84**: 2285-92.

Containing pandemic influenza with antiviral agents. Longini IM *et al. Am J Epidemiol* 2004; **159**: 623-33.

ANNEX A

Proposed composition of the Health Departments' UK National Influenza Pandemic Committee (UKNIPC)

REMIT

To provide specialist advice to the UK Health Departments on the health response during an influenza pandemic

MEMBERSHIP

Chair

Minister, Chief Medical Officer England or senior DH official

Members*

Government Chief Medical Officer, if not chair
Department of Health
- Chief Nursing Officer
- Chief Pharmaceutical Officer
- Chief Dental Officer
- Head of Health Protection, International Health and Scientific Development
- Head of Delivery Unit
- Head of Health Protection
- Head of Emergency Preparedness and Response
- Head of Communications
- Representative from DH Press Office
- A Regional Director of Public Health (representing also Regional Resilience)

Representatives from
- UK Devolved Administration Health Departments
- Medicines and Healthcare products Regulatory Agency
- The NHS (a Strategic Health Authority, Primary Care Trust, Hospital/Foundation Trust, Ambulance Trust)

The Health Protection Agency
- Chief Executive
- Directors of HPA Divisions, as appropriate
- A Consultant in Communicable Disease Control

Director of NIBSC
Director of the NIMR WHO Collaborating Centre
Representative of the Health and Safety Executive

Secretariat: provided by HPIH&SD-HP

* Members may be represented by an appropriate official with sufficient seniority and expertise to take executive decisions on behalf of their organisation

Members who may be co-opted/observers as required, or members of subgroups

Department of Health
- Economical and Operational Research Division

Chairs or representatives of Government Advisory Committees
- Joint Committee in Vaccination and Immunisation
- JCVI Influenza Subgroup
- Advisory Committee on Dangerous Pathogens
- National Expert Panel on New and Emerging Infectious Diseases

Representatives of other bodies:
- PASA (NHS Purchasing and Supplies Agency)
- National Institute for Clinical Excellence (NICE)
- Royal College of Anaesthetists
- Royal College of General Practitioners
- RCGP Research Unit, Birmingham
- Royal College of Nursing
- Royal College of Paediatrics and Child Health
- Royal College of Pathologists
- Royal College of Physicians (ID Physician)
- British Medical Association
- Royal Pharmaceutical Society
- Medical Research Council
- Vaccine and other Pharmaceutical manufacturers
- Relevant charities/Non-governmental Organisations (NGOs)/patient organisations
- A general/respiratory and/or infectious disease physician, geriatrician, occupational physician and/or paediatrician
- A veterinary virologist/pathologist

Other Government Departments

International representatives
- CDC Atlanta
- WHO

A mathematical modeller

Other media representatives and/or telecommunications and media relations experts

Leaders of major religious groups, business, education, sporting and other recreational communities

Infection control expert

Health and Safety Executive representative

Health Protection Scotland

Directors of HPA Divisions, as appropriate

Terms of Reference

To provide specialist advice to the UK Health Departments on the health response during an influenza pandemic.

The National Influenza Pandemic Committee is the main forum for provision of specialist advice to the UK Health Departments to inform their response to an influenza pandemic. The Committee will play a critical role in ensuring that UK Health Ministers and Government are provided with timely, high quality policy and operational advice and recommendations, to support the health response to an influenza pandemic in the UK.

DH has also established an Influenza Pandemic Scientific Advisory Group (SAG) which will advise on the scientific evidence base for health-related pandemic influenza policies. Members of the UKNIPC will take the work of the Influenza Pandemic SAG into account in its deliberations and in its reports to the UK Health Department.

Members of the Committee will:

- bring relevant experience to the Committee
- contribute to the provision of high quality and considered advice to UK Health Ministers
- be expected to make a full and considered contribution to the work of the Committee and to contribute fully to the debate and to the decision making processes of the Committee
- provide guidance when an issue which falls within their particular area of expertise is under discussion
- contribute to the debate in the capacity of a well-informed observer where the issue does not fall within their expertise
- be prepared, as requested by the Secretariat, occasionally to provide expert advice on relevant issues outside Committee meetings;
- be prepared to attend as required and contribute to the deliberations of the Influenza Pandemic Scientific Advisory Group or other appropriate committees.

In addition to their work on the UKNIPC, members of the Committee may be called upon to attend the Influenza Pandemic SAG or to provide advice on matters arising on which the member's particular expertise may be of assistance to the public service. It is recognised that in a pandemic situation, such requests may need to be made at short notice and that deadlines are likely to be very short.

Composition of the Health Departments' Scientific Advisory Group

REMIT

To advise the UK Government on scientific matters relating to the health response to an influenza pandemic.

MEMBERSHIP

Chair

Head of Health Protection Division, International Health and Scientific Development

Members*

Department of Health
- Chief Scientist

Principal Medical Officer
Senior Medical Officer
Chief Economic Officer
- Director of Research and Development
- Operational Research Division
- Modellers
- Senior Scientist
- Technical Officer
- Director of Public Health, SHA

The Health Protection Agency
Directors of HPA Divisions as appropriate, including
Emergency Planning
Scientific Program Head
Modellers
Virology
Director of NIBSC
Chief Scientific Officer, DEFRA
Chief Scientific Advisor, DfID
Chief Scientific Advisor, MoD
Research Management, MRC
TDST Directorate, OST
Mathematical Modellers
- Imperial College

University of Sheffield Medical School
Devolved administrations
Welsh Assembly
Scottish Executive
DHSSPSNI

* Members may be represented by an appropriate official with sufficient seniority and expertise to take executive decisions on behalf of their organisation

Members who may be co-opted/observers as required, or members of subgroups
Chairs or representatives of Government Advisory Committees
- Joint Committee in Vaccination and Immunisation
- JCVI Influenza Subgroup
- Advisory Committee on Dangerous Pathogens
- National Expert Panel on New and Emerging Infections

Medical specialists
Representatives of other bodies
Other Government Departments
International representatives
Secretariat: provided by HPIH&SD-HP

Terms of Reference

INFLUENZA PANDEMIC SCIENTIFIC ADVISORY GROUP

To advise the UK Government on scientific matters relating to the health response to an influenza pandemic.

The Group's advice will be provided to the UK Government, and will contribute to the work of the UK National Influenza Pandemic Committee which will incorporate this advice in its reports to the Secretaries of State.

In addition to their work on the Group, members may be called upon to attend the UK National Influenza Pandemic Committee or to provide advice on matters arising on which the member's particular expertise may be of assistance to the public service. It is recognised that in a pandemic situation, such requests will need to be made at short notice and that deadlines are likely to be very short.

The Group will play a critical role in ensuring that the UK National Influenza Pandemic Committee and Ministers are provided with a high standard of scientific advice to support the health response in the UK and are kept informed of any new developments in science and research. Members of the Group will:

- bring relevant experience to the Group;
- contribute to the provision of high quality and considered advice to UK Ministers of health;
- be expected to make a full and considered contribution to the work of the Group and to contribute fully to the debate and to the decision making processes of the Group;

- provide expert guidance when an issue which falls within their particular area of expertise is under discussion;
- contribute to the debate in the capacity of a well-informed professional where the issue does not fall within their expertise;
- be prepared, as requested by the Secretariat, to provide occasionally expert advice on relevant issues outside Group meetings;
- be prepared to attend as required and contribute to the deliberations of the UK National Influenza Pandemic Committee or other appropriate committee.

ANNEX B

Influenza: background information

Influenza viruses

Influenza has been known for centuries, but influenza viruses were first identified only in 1933. Influenza viruses infect humans and a large spectrum of birds and mammals. The viruses are grouped into three types, influenza A, B and C, subtypes of all of which can cause infection in humans. Influenza A viruses circulate most years, generally cause more serious illness than B and C and are the cause of most winter epidemics and all known pandemics. Influenza B viruses circulate at low levels most years causing sporadic and generally less severe outbreaks and epidemics, particularly among young children in school settings. Influenza C viruses usually cause only minor respiratory illness, such as symptoms of the common cold, and are generally not considered a public health concern.

Frequent genetic modification of the human influenza A viruses which circulate each year results in changes to their main surface antigens, the haemagglutinin (H) and neuraminidase (N). These year on year changes in influenza viruses are usually minor (and referred to as 'antigenic drift'), but they help to maintain the viruses in circulation, as the immunity people develop to one year's strain no longer provides ideal protection against subsequent viruses. This phenomenon also explains why influenza vaccines need to be re-formulated every year.

The pandemic potential of influenza viruses

Influenza A viruses mutate much more readily than type B viruses. They can also infect pigs, horses, sea mammals and birds, in addition to humans. From time to time, a major step-wise adaptation of a virus, or exchange of genetic material between influenza viruses, including between those of human, pig and avian origin to produce a 'genetic hybrid, results in a major change in the surface antigens (called 'antigenic shift'). Antigenic shift is specific to influenza A viruses, and these are the changes that can confer pandemic potential, as long as the resulting virus:

- can infect and cause disease in people (rather than just mammals or birds)
- can spread efficiently from person to person, and
- a high proportion of the population is susceptible.

False alarms may occur, when a new virus is identified but proves not to have the characteristics necessary for it to spread in the human population. This happened in 1976, 1997 and 1998, and has so far been the case during the H5N1 outbreaks of avian influenza that have affected poultry flocks across China and SE Asia during 2004 and 2005.

Influenza – the illness

Influenza is an acute viral infection characterised by the sudden onset of fever, chills, headache, muscle pains, prostration, and usually cough, with or without a sore throat or other respiratory symptoms.

In the non-pandemic situation, most otherwise healthy people recover from influenza without complication after about a week, although they may feel tired and with 'low spirits' for longer.

Death may occur early (within 24-36 hours of onset of symptoms) apparently from overwhelming virus infection, but is more common later, as a result of complications. Roughly 50% of all infections are however asymptomatic; asymptomatic infection is especially common in children.

Complications are mainly respiratory, due to secondary bacterial infections such as otitis media (in children), bronchitis and pneumonia which may require admission to hospital and may result in death. Influenza may also exacerbate underlying diseases such as asthma, diabetes or heart disease. Primary viral pneumonia occurs more rarely but can be rapidly overwhelming and fatal.

Those at higher risk of more serious illness should they catch flu include:

- Older people (generally taken as those aged 65 and over) and the very young
- People with chronic chest, heart or kidney disease, diabetes, or reduced immunity due to disease or treatment.

Extent of illness

Influenza viruses circulate in the community to some extent every year. This annual 'seasonal' influenza causes a variable amount of illness in local populations, which in the northern hemisphere is mainly during a 6-8 week period each winter. About one in 5 people who become ill consult their GP and GP consultations for 'influenza-like illness' (ILI) usually rise sharply over 2-4 weeks during this period, from a baseline (in England and Wales) of up to 30 new consultations per 100,000 population per week to a peak varying from around 200 in most years, to over 400 in more severe years. Rates from 30-200 are regarded as 'normal winter activity' and the term 'epidemic' is usually reserved for

rates >200. (The equivalent levels in Scotland are: baseline, up to 50; normal seasonal activity 50-600; higher than normal activity 600-1000; epidemic activity >1000.) The age-specific incidence and the severity of illness both vary from year to year.

The estimated number of people admitted to hospital as a result of influenza equates to roughly one in every 30 of the GP consultations, although this varies considerably with age.

Mortality

In inter-pandemic years, death is reported in 0.5-1 per 1,000 cases of influenza, mainly in the elderly. It is estimated that without interventions such as vaccination, influenza results in up to 12,000 excess deaths (more deaths than would have been expected) in England and Wales, although the figure has been substantially higher in severe epidemic years (29,000 in 1989/90, for example)

Infectivity and spread

Influenza is highly infectious, spreading from person to person mainly via the respiratory route through infected respiratory secretions produced when an infected person talks, coughs or sneezes. Transmission may also occur through hand/face contact after touching a person or surface contaminated with infected respiratory secretions. Adults may be infectious from just before until 4-5 days after the onset of symptoms; children and people who are immunocompromised tend to excrete virus for much longer (up to 14 days for children and 21 days for immunocompromised persons). The incubation period is normally 1-3 days, typically 2.

Influenza may spread very rapidly in crowded conditions and among people in enclosed communities especially where the residents are particularly vulnerable, such as in long stay residential care.

Diagnosis

Influenza is essentially a clinical diagnosis, although the symptoms and signs of influenza are similar to those caused by other acute respiratory viruses. Diagnostic accuracy increases with increasing levels of influenza activity.

Confirmation of the clinical diagnosis is by one or more of the following laboratory tests:

- Immunoflourescence
- PCR

- Culture of the virus
- Serological confirmation of a four-fold increase in antibodies

The most informative patient sample is a good quality respiratory specimen (combined nose and throat swab) taken early on in the illness when viral excretion is highest. Near-patient tests are also available.

It is essential that a representative proportion of viruses are identified and sequenced, for the purposes of surveillance and for monitoring the evolution of influenza viruses. Confirmation should especially be sought if there are unusual circumstances, such as a travel history to an area of the world (or country) currently experiencing outbreaks of highly pathogenic avian influenza in poultry, during institutional outbreaks and for infections occurring at the beginning and end of the winter season.

Treatment of influenza

Influenza is a viral infection and antibiotics therefore do not work, unless there is a secondary bacterial complication such as pneumonia.

For most people, influenza is a self-limiting illness and self-treatment with symptomatic remedies is indicated.

The National Institute for Clinical Excellence (NICE) has issued guidance on the use of antiviral drugs for the treatment and prevention of seasonal influenza (www.nice.org.uk). Treatment with a neuraminidase inhibitor is recommended, within the licensed recommendations of the drug, for adults (oseltamivir or zanamivir) and children (oseltamivir only) who fall within certain 'high-risk' groups, who become ill when influenza is circulating in the community, and in whom the drugs can be started within 48 hours of the onset of symptoms.

More information on antiviral drugs is at Annex H.

Influenza prevention and control

Interventions against seasonal influenza are currently targeted at reducing the severity of illness, complications, hospital admissions and deaths in those most at risk. They are not aimed at reducing transmission of infection other than in long stay residential care accommodation and between health and social care workers and their patients.

Immunisation

The mainstay of influenza control is immunisation. New vaccine is prepared each year to provide protection against the three strains of influenza virus predicted to be most prevalent during the forthcoming winter. It is recommended as part of public policy for those people most at risk of serious illness should they catch influenza, in the UK these being:

- All people aged 65 and over
- People with chronic respiratory, heart or renal disease or diabetes
- People with impaired immunity due to disease or treatment
- People in long stay residential care

Immunisation is also offered to health and social care workers involved in direct patient care. Around 12 million doses of influenza vaccine are now administered each year in the UK, with the 70% target uptake in those aged 65 and over now achieved in England (71% in 2003).

These recommendations are reviewed regularly by the Joint Committee on Vaccination and Immunisation.

More information on influenza vaccines and their production is at Annex G.

Antiviral prophylaxis

NICE has also issued guidance on the use of antiviral drugs for the prophylaxis of influenza during seasonal influenza.

Where it is known that influenza A or B is circulating in the community, oseltamivir is recommended for the post-exposure prophylaxis of influenza in at risk-people aged 13 or older who are not actively protected by vaccination and who have been exposed to someone with influenza-like illness and are able to start prophylaxis within 48 hours of exposure.

Oseltamivir is also recommended for the post-exposure prophylaxis of influenza, with the same caveats, for people whether or not they have been vaccinated if they live in a residential care establishment where a resident or staff member has ILI.

NICE does not recommend the use of amantadine for treatment or prevention of seasonal influenza, but it may have a place, particularly in prophylaxis, in an influenza pandemic, if the pandemic virus is susceptible.

More information on antiviral drugs for influenza is at Annex H.

Influenza in mammals and birds and its relevance to human infection

There are 16 haemagglutinin subtypes of Influenza A (designated 1-16), and 9 neuraminidase subtypes (1-9). While relatively few infect humans, all have been detected in free-flying birds which can harbour the viruses without their causing symptoms. Since 1959, rare, but serious, outbreaks of highly pathogenic avian influenza in poultry have been caused by H5 and H7 virus subtypes. These were thought to cause only mild symptoms such as conjunctivitis in humans. However, since an outbreak of H5N1 infection in poultry in Hong Kong in 1997, these viruses have been shown to be able to jump the species barrier and cause severe infection with a high mortality in humans.

So far these viruses only appear to have spread from person to person with difficulty, and with no further onward transmission, but concern is twofold:

- That step-wise adaptation of the viruses will give them greater affinity to infect and transmit between humans;
- That exchange of genetic material between the avian and a 'regular' circulating human virus – during co-infection, for example, in a pig or possibly a person – will have the same effect.

The longer the outbreaks of H5N1 influenza that took hold in Asia in early 2004 last – and there are signs that the virus has become endemic in birds in the region – the more likely it is thought to be that a new virus will emerge. Even if the ability of the virus to cause disease in humans is attenuated, the potential remains for a future virus with pandemic potential to emerge and spread. Such a strain is likely to be antigenically different from the H5N1 strains currently circulating in Asia. The degree of cross protection that would be afforded by an H5N1 vaccine prepared against the current H5N1 strain cannot be predicted.

ANNEX C

PREVIOUS INFLUENZA PANDEMICS

1. Influenza pandemics have occurred throughout recorded history and have been documented since the 16th century. There have been substantial differences between them, including between the three pandemics of the last century. There is therefore considerable uncertainty about both the timing of a future pandemic and its precise impact – the severity of illness caused by the new virus strain, the rapidity of its spread and the groups of the population which will be most susceptible are all unknown factors. Nonetheless, for planning purposes, reports of previous pandemics give an interesting insight into the likely range of impact.

When will the next pandemic be?

2. Intervals between previous pandemics have varied from 11 to 42 years with no recognisable pattern. The last pandemic was in 1968/69. Prior to that pandemics occurred in 1957/58 and 1918/19.

Pandemic virus strains and their origins

3. Previous pandemics have been due to influenza A viruses. That of 1918/19 (before influenza viruses were discovered) was due to an H1N1 virus, possibly derived by adaptive mutation of an avian virus. The 1957/58 pandemic was due to an H2N2 virus containing a mixture of avian and human virus genes, as did the H3N2 virus causing the 1968/69 pandemic.

4. In recent years, strains of both Influenza A(H1N1) and A(H3N2) viruses have co-circulated. Re-emergence of an H2 or N7 component, or more recently an H5 component, has been anticipated by some as the most likely event leading to a pandemic, although several other haemagglutinins exist in nature and could emerge.

Spread

5. In 1918/19 the first cases were reported from Europe and the USA, although the origin of the new virus has not been established. More typically, new influenza viruses have emerged in the Far East and spread along trade and transportation routes. In inter-pandemic years, spread of a new variant of an existing strain takes about 18 months, allowing the new strain to be incorporated into the annual vaccine before it causes widespread illness. Previous pandemic strains have spread worldwide in about 6 months, although successive waves of illness may occur over a longer period.

6. The 1889 pandemic was believed to have originated in China and spread via Russia to Western Europe and thence to North America and then Japan. While the origins of the 1918 pandemic are not so clearly mapped, it was recognised in Spain in the early months of 1918 and by April was widespread in Western Europe. During that spring and summer, large numbers of people were affected with relatively mild disease. The high mortality occurred in the later waves that occurred in the autumn and then the early part of 1919.

7. The 1957 Asian flu pandemic took 6-7 months from the first isolate being identified in China (Feb 1957) until the peak of illness in the UK, although some cases occurred in the UK as early as June 1957 in people travelling from abroad (by ship and air) and in small groups and closed communities. The explosion of cases in September occurred after children went back to school after the summer holidays; the first wave was over by December.

8. 'Hong Kong' flu, which was a less dramatic virus 'shift', was first isolated in Hong Kong in July 1968. It then spread worldwide during the following two winters, causing greater morbidity in some countries the first winter and others the second. In the UK, contrasting patterns occurred during the two seasons:

First isolate	Hong Kong, July 1968
First isolate in Britain	London, August 1968
Isolates from people with contacts abroad	Autumn 1968
Outbreaks in closed communities	Autumn 1968
First community outbreaks	December 1968
Increased influenza activity	until April 1969
Sharp epidemic	Dec 1969/Jan 1970

9. The following changes since 1968 can be anticipated to shorten the time taken for the virus to spread:

a. The opening up of China to trade and tourism;

b. Increasing international movement of people and greater use of more rapid methods of transportation.

10. In addition, increasing use of new routes out of China such as through Cambodia and Vietnam where surveillance is not well developed may result in failure to document the early stages of spread of a new virus.

Time of year

11. Pandemic influenza may appear at any time of the year, not necessarily during the 'normal' influenza season (November-March):

Year		Peak illness in UK
1889/90		January
1918/19	1st wave	July
	2nd wave (worst)	November
	3rd wave	February
1957/58		September/October
1968/69	1st wave	March/April
1969/70	2nd wave	January

Length of activity in the UK

12. In most epidemics activity can be expected to last 6-8 weeks. The same applies to pandemic influenza activity in the UK, although in 1968/69 lower levels of activity continued for 3-4 months.

Incubation period

13. On past experience, this is likely to be 48-72 hours. Adult patients are likely to be infectious for about 4-5 days: virus titres in nasopharyngeal washes usually fall to low levels by the fifth day, although virus shedding is usually more prolonged in children.

Estimates of incidence of illness

14. Studies of the 1918 pandemic indicate that about 23% of the UK population developed influenza. In the 1957/58 Asian influenza pandemic an estimated 17% of the UK population suffered influenza illness (9 million cases). In 1969/70, the Hong Kong virus produced illness in an estimated 8% of the UK adult population, although antibody levels in two groups of adults investigated showed that subclinical infection was more common: one quarter had been infected in the first year and an additional one third in the second.

15. The World Health Organisation suggests that plans are in place against a pandemic causing illness in 25% of the population. The worst possible – although unlikely – scenario would be a 100% attack rate.

Incidence by age and sex

16. In normal years, although most influenza infection is in children, the serious morbidity and mortality is almost entirely among elderly people with underlying chronic disease. A different pattern may emerge in a pandemic.

17. The 1918-19 pandemic affected mainly healthy young adults and seemed to spare those at the extremes of life. Similarly, in 1957, the brunt fell on schoolchildren and young adults with attack rates as follows:

Age	Attack rate
0-4 years	31%
5-14	49%
5-39	27%
40-59	25%
60+	12%

Males and females were equally affected.

18. In contrast, during the peak of activity in 1968/69 and 1969/70 low rates were recorded in children aged 5-14. During the first year the highest rates were in children under 5 years and the lowest in adults over 65 years, while the following year the highest rates were in adults aged 45-64 and the greatest increase was recorded in adults over 64.

Mortality

19. The increase in mortality during influenza epidemics and pandemics far exceeds that recorded as being due to influenza.

20. The mortality worldwide in 1918-19 has been estimated to be upward of 20-40 million. In some areas this reduced life expectancy by around 10 years. In England and Wales, 200,000 excess deaths occurred of which 150,000 were ascribed to influenza – just over 3,000 deaths from influenza per million population were recorded in 1918 and 1,170 per million in 1919.

21. In 1957, which was on the whole a milder illness, the global death toll was estimated to be around 2 million. An excess 30,000 deaths occurred in England and Wales of which 6,716 were ascribed to influenza itself. Estimates ranged from 1.3 to 3.5 deaths/1,000 cases. An estimate from 29 general practices was 2.3 deaths per 1,000 cases attended. Two thirds of the deaths were in people aged over 55 years.

22. The 1968/69 pandemic, which was milder, is thought to have caused around 1 million deaths worldwide. The two years contrasted in England and Wales:

	1968/69 (4 months)	1969/70 (2months)
Peak deaths /week	2,550	10,500
Total XS flu deaths	1,000	10,000
Total XS BPI* deaths	12,000	>32,000
Total XS deaths (all causes)	31,000	47,000

* Bronchitis, pneumonia, influenza

23. Deaths are mainly in the very young and the elderly. The exception was in 1918/19 when a high death rate among young adults was observed – 99% of the mortality was in people under 65 years of age.

24. The main complication of influenza is secondary bacterial infection, particularly of the lungs, staphylococcal pneumonia being the most serious. In 1957, of patients with pneumonia studied mainly in London teaching hospitals, 28% of those with staphylococcal pneumonia and 12% with non-staphylococcal pneumonia died. The death rate among patients with pneumonia fell during the course of the epidemic from around 20% to 13%. Deterioration can be very rapid and a high proportion of those hospitalised who die, do so within 48 hours of admission, ie so rapidly that antibiotics may have little or no effect.

25. In 1957, in common with all major influenza epidemics, although influenza, pneumonia and bronchitis accounted for nearly all the excess admissions to hospital during the epidemic, half the deaths were assigned to other causes.

Effect on general practice

26. The demand for new general practice consultations for influenza-like illness can be expected to exceed 500/100,000 population/week during a pandemic; per practice of 10,000 patients, the demand for new consultations would therefore be expected to exceed 50 per week.

27. Lower rates might be recorded if the period of activity was prolonged. Similarly, a short sharp epidemic puts considerable strains on general practice: during the peak of the 1957 epidemic, practitioners recorded seeing 80-100 cases/day and at the peak of the 1969/70 pandemic consultation rates reached 1,260/100,000 population in two successive weeks.

Effect on hospital admissions

28. During September and October 1957, the two main months of the epidemic, it was estimated between 25,000 and 30,000 more cases of acute respiratory infection were admitted to NHS hospitals in England and Wales than would have been expected at that time of year. Hospital admission and bed bureaux could barely cope with the demand placed upon them, the following figures being recorded by bed bureaux:

Year	Total admissions Liverpool Bed Bureau (Sept/Oct)	Acute resp admissions London Bed Bureau (23 Sept-5 Nov)
1953	1781	
1954	1710	734
1955	1671	924
1956	1654	1015
1957	2808	2477

29. Discharges from Departments of General Medicine in Liverpool increased by 27%. Influenza, pneumonia and bronchitis accounted for nearly all the excess admissions.

Absence from work

30. In 1957, new sickness benefit claims in those working aged 15-64 increased by 2.5 million (out of 17.5 million insured). An additional 1.5 million absences were estimated from the uninsured. The rise began at the end of August, peaked at the beginning of October, and then fell rapidly. 8-10% of the insured population was estimated to have lost 3 or more working days at some time during the epidemic. The percentage absenteeism during this period increased by 4.5-6.0% in several large organisations, though some smaller factories sufferred more severely.

31. In 1968/69 just over 1 million excess sickness claims were received over 5 months and, in 1969/70, 1.5 million over 6 weeks.

Health care staff

32. In Liverpool in 1957 12.6-19.4% of nurses were absent during the first 4 weeks of the epidemic; in one hospital, nearly a third were absent at the peak.

Effect on schools

33. Influenza can spread rapidly in schools. In 1957, up to 50% of schoolchildren developed influenza, but even those schools which were severely disorganised had returned to normal 4 weeks after the appearance of the first case. In residential schools, attack rates reached 90%, often affecting the whole school within a fortnight.

Control measures

34. There is some evidence that big gatherings of people encourage spread, and measures to flatten the epidemic curve can helpful in easing the most intense pressure on health services. In general, however, quarantine has been ineffective, at the most postponing epidemics of influenza by a few weeks to 2 months and even the most severe restrictions on travel and trade have gained only a few weeks. The exception was Australia, in 1918, when maritime quarantine was instituted. This delayed the onset of illness in Australia until 1919 when the virus appeared to have lost some of its virulence. The subsequent epidemic was of milder illness but longer duration than in other countries. Nonetheless, 60% of the mortality was in people aged 20-45 years.

ANNEX D

MODELLING

Introduction

1. This annex outlines the principles underlying the use of modelling in preparing for an influenza pandemic and reviews some of the results so far. Modelling is still underway to refine planning. In a pandemic real time modelling would be used to further refine contingency plans.

Using modelling to inform planning

2. 'Modelling' can be used to describe many diverse activities. However, the essence is to use one's broad knowledge of whatever system is under consideration to construct a simplified or idealised version, the 'model'. The model can then be analysed in detail, often using mathematical techniques. Depending on the questions being asked different simplifications will be appropriate and many different models are usually required to capture the different aspects of a complicated problem. Knowledge of how a model fails to capture all the aspects of the real situation is often as important as the model itself.

3. Modelling can only be as good as the data fed into the models and the assumptions made in the design of the models. In the case of dealing with a new pandemic flu virus there is little data and a wide range in the plausible assumptions. The role of modelling is thus to map out the range of possible risks and to suggest which responses are robust over the range of uncertainty.

4. In the main, two kinds of model are being studied in planning responses to a Flu Pandemic. The first consists of epidemiological models considering how the disease will spread and the effectiveness of countermeasures. The second consists of 'operational' models looking at the mechanics of how countermeasures can be implemented. Some economic modelling has also been used to look at the costs of an epidemic and its wider effect on the economy.

5. Where possible the assumptions in this modelling work are based on data from previous pandemics. Where not, information about known flu viruses is used to provide estimates.

6. The majority of the modelling used to provide the description of a pandemic in section 4 of this plan is based both on epidemiological models of what would happen if a pandemic arrived in the UK without any intervention, and empirical information from past pandemics. The purpose of this analysis is to indicate the scale of the problems involved

in dealing with a pandemic. Where the effectiveness of interventions is discussed, the results are based on expert consensus based on a consideration of the results of a number of different models.

Modelling Capacity

7. The UK is fortunate in having a number of infectious disease modelling groups (including those in the Health Protection Agency and at the Department of Infectious Disease Epidemiology, Imperial College, London) with an interest in pandemic influenza. These groups have developed and parameterised a wide range of models to assess alternative pandemic influenza control/mitigation options. In addition the Department of Health has its own operational research team who assist in the interpretation of the results from the modelling groups and advise on their conversion into practical responses.

8. The Department of Health also maintains contact with modellers in other countries. The Global Health Security Advisory Group (GHSAG) of G7 countries plus Mexico has a workstream on pandemic flu, jointly chaired by the UK and the US. As part of this work, in June 2005, the UK hosted a modelling workshop in London.

Work Areas

9. The modelling work can be broadly grouped into five work areas:

- Characteristics of a UK epidemic of pandemic flu without intervention (Health impact assessments).
- The possibilities of containment of a pandemic outside the UK and slowing/preventing subsequent arrival in the UK.
- Antiviral use within the UK (both in treatment and containment).
- Other possible pre-vaccination preventative measures.
- Vaccination strategies in the UK.

Review of Results

10. The results of modelling the first area are discussed extensively in section 4 of the main plan. In this annex we will briefly review what is currently known in the other areas.

The possibilities of containment of a pandemic outside the UK and slowing/preventing subsequent arrival in the UK.

Initial outbreak

11. What we know:

- Targeted antiviral prophylaxis and local travel restrictions might contain an outbreak in South East Asia.
- Regardless of whether the containment measures prove to be effective, disease surveillance will be required to estimate important disease parameters such as the (age-specific) attack and mortality rates. It is uncertain exactly how long it will take to derive reasonable initial estimates for these and other parameters. It seems reasonable to assume that, if the disease starts in Asia, taking about a month to build up to about a thousand cases and a further 2 to 4 weeks to spread to the UK, estimates of the mortality rate will be available by the time it reaches the UK. Attack rates are more difficult to estimate, so reasonable estimates for these parameters may take longer to derive.

12. Planning implications:

- Ensure that all intervention strategies are able to accommodate the full range of possible disease parameters with the ability to take account of surveillance information when it becomes available. Initially work to the assumed attack rate of 25% but put in place mechanisms to easily modify the response as further information becomes available.

International spread

13. What we know:

- Pandemic flu would probably take about a month to build up from a few to around a thousand cases and then perhaps only 2 and 4 weeks to spread from Asia to the UK. Imposing a 90% restriction on air travel would delay the peak of a pandemic wave by only 1 to 2 weeks. On the other hand a 99.9% travel restriction might delay a pandemic wave by 2 months.
- If there is a substantial seasonal effect on the transmissibility of pandemic flu it might, theoretically, be possible to "buy" enough time to shift what would otherwise have been a winter outbreak to the

spring (or a spring outbreak to the summer), when the lower transmissibility would result in a smaller outbreak.

- Assuming passengers are screened before travel for clinical symptoms, there is little additional advantage in entry screening.

Antiviral use within UK (treatment and containment).

14. What we know:

- A pandemic flu outbreak cannot be contained in the UK because of the large number of seed cases (i.e people bringing the disease in from abroad) that would be expected. The disease would be expected to spread to all major UK centres of population within 1 to 2 weeks.

- Mass provision of antivirals to the population would simply postpone the outbreak by the period for which prophylaxis is provided. However, such mass prophylaxis would deplete antiviral stocks very quickly (at a rate of one treatment course per 10 person days).

- Previous estimates for weekly totals for outcomes such as clinical cases, deaths, and hospitalisations over the course of a single wave pandemic were based on 1) assumptions about the overall clinical attack rate, mortality rate and proportion of cases in which complications develop, and 2) a model of the disease. The disease model determined the temporal profile of the outbreak. These assumptions driving the model were chosen to give similar results to the 1957 pandemic. Other pandemics had a faster spread, in general the weekly profile for these pandemics has a higher peak and a shorter base. A profile based on a composite of the historical profiles is now used for planning were temporal details are important. This profile is shown in figure D.1. However, mass treatment of clinical cases with antivirals would probably flatten this temporal profile, lowering the peak and lengthening the base.

- The UK case fatality rate for previous pandemics was of the order of 0.2 to 2%. In contrast, recent estimates of the case fatality rate for Avian flu are of the order of 50%. The estimates for Avian flu are almost certainly overestimates of the mortality for a pandemic strain. The week-by-week totals for deaths in section 4 are based on an overall case fatality rate of 0.37% (and a clinical attack rate of 25%), however case fatality rates of up to 2.5% have been considered.

- For previous pandemics, the overall clinical attack rate (cumulative across all waves) has been of the order of 10 to 25% in the UK. A reasonable upper bound for the cumulative clinical attack rate would appear to be 50%. The worst case scenario would be a single wave pandemic with a clinical attack rate of 50%. Estimates of the proportion of infected individuals who go on to become clinical cases range from 50 to 67%.

- Antivirals are most efficiently used for treatment. If the available stock is less than the clinical attack rate it will be necessary to limit treatment to priority groups. For a given stockpile, the stock available for use in treatment will depend on how much is used for prophylaxis (be it targeted prophylaxis for containment, or prophylaxis of essential workers or their contacts).

- Although the main purpose of antiviral treatment is to reduce the severity of the disease, treating all clinical cases with antivirals might also decrease the overall attack rate. There is considerable uncertainty as to the extent of the reduction possible. Some models suggest a reduction of up to one third. This suggests, for example, that treating all cases in an outbreak for which the attack rate would be 50% without treatment might only require enough antiviral courses for ~35% of the population.

- The other use for antivirals is prophylaxis of essential workers. However, absence rates are likely to remain relatively low (less than 10%) except for NHS workers dealing with those infected and the cost, in terms of antiviral stocks is high.

- In the early stages of a pandemic, the groups for whom the risk of complications or death is greatest will not be known. As the outbreak progresses, surveillance data will accumulate, and it will become possible to identify risk groups and estimate key disease parameters. If the pandemic starts in Asia, reasonable estimates of some (but probably not all) disease parameters should be available by the time the disease reaches the UK. However, if the pandemic starts in the UK, no such estimates will be available initially.

15. Planning implications:

- Develop a flexible system that would enable antiviral treatment to be targeted dynamically at different priority groups as required, restricting use to priority groups if attack rates are high but ensuring high coverage if attack rates are low.

Other Pre-Vaccination Measures

16. What we know:

- Even very substantial restrictions on travel within the UK (~60%) would delay the peak of an epidemic only by of the order of a week, make little difference to the total numbers of cases and reduce the peak incidence by at most 5-10%.
- Closing schools and other educational facilities would have a limited effect on the epidemic. There would be a major reduction in the numbers of students affected, and this would be important if children or young adults turned out to be 'at risk' groups. On the other hand, there would be little reduction in the number of cases in the rest of the population.
- There is little evidence that cancelling large public events would have any significant impact on the course of the epidemic.

Vaccination.

17. What we know:

- Supplies of vaccine may be available for the second wave of a pandemic. Whether this is the case depends on: how long the first wave lasts, how long after the start of the first wave vaccine production starts, how long after the end of the first wave the second wave starts and how long it takes to produce the vaccine. None of these is known with certainty, so it is impossible to be certain that any vaccine will be available for the start of a second wave. Peak illness rates for the three waves of the 1918/1919 pandemic were observed in July 1918, November 1918 and February 1919. This gives a minimum peak-to-peak interval of 3 months, suggesting an interval between the end of the 2nd and the start of the 3rd wave of little more than 1 month. It is expected that vaccine will start to become available approximately 6 months after the start of the pandemic, so for an inter-pandemic period of 1 month vaccine would almost certainly not be available for the start of the second wave.
- Even if there is time to produce some vaccine before the start of the second wave, there may not be time to produce a large amount of vaccine. The amount of vaccine available at the start of a second wave will depend not only on the duration of the first wave, how soon vaccine production starts, and the inter-wave period but also on the vaccine production schedule, the details of which are not yet known.

- The number of individuals who develop immunity to the pandemic strain in response to the first wave will depend on the overall attack rate for this wave, which in turn will depend on the intervention strategies adopted.

18. Planning implications:

- Ensure that plans for vaccine use, possibly coupled with antivirals, are flexible enough to a) accommodate a wide range of levels of vaccine availability and b) make appropriate use of surveillance data from the first wave.

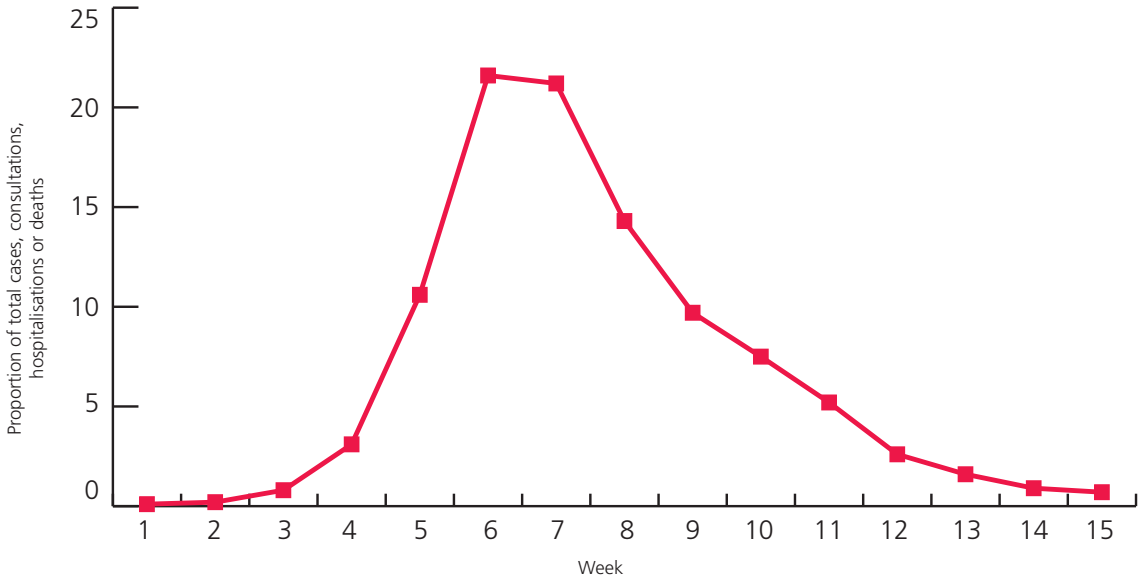

Figure D1. Illustration of the single wave profile showing proportion of new clinical cases, consultations, hospitalisations or deaths by week. The profile is a weighted average of the deaths attributed to influenza in England and Wales in the 1969/70 and 1957 pandemics, and London in 1918. The weights were based on the overall mortality rate. The resulting profile is close to that of the 1918 pandemic. A similar profile is obtained by weighting using the population effected.

ANNEX E

THE LEGAL FRAMEWORK

International

1. Although influenza has the potential to spread rapidly and has demonstrated its ability to have a serious public health impact, there is currently no international obligation to notify cases to the World Health Organization (WHO). However, the voluntary international surveillance network co-ordinated by WHO provides an international alerting mechanism.

2. The European Commission funds a European Influenza Surveillance Scheme (EISS). Under Decision 2119/98/EC of the European Parliament and of the Council (Setting up a network for the epidemiological surveillance and control of communicable diseases in the Community), Article 4, the UK is required to inform the Commission and other Member States of any relevant infectious disease threats with public health implications for one or more other Member States, together with information on control measures applied. The recently established EU Centre for Disease Prevention and Control in Stockholm is developing its capacity and capability.

3. Current International Health Regulations (IHR) are based on a narrow list of specified infectious diseases that must be reported, which does not include influenza. These Regulations are being revised by WHO with a view to incorporating a decision support algorithm that could assist in the identification and notification of other infectious diseases that may constitute an international threat.

National

4. Public health powers in the UK are provided by the Public Health (Control of Disease) Act 1984 (c.22) in England and Wales, The Public Health Act (Northern Ireland) 1967 (c.36) and in Scotland, the Public Health (Scotland) Act 1897 (c.38) and Health Services and Public Health Act 1968 (c.46). There are other relevant powers in the National Health Service Act 1977 (such as the power to direct as to exercise of functions in Section 17 (Secretary of State's directions; exercise of functions) and the power to provide a microbiological service in Section 5(2) (other services) of the 1977 Act).

5. Powers under Public Health Acts generally rest with local authorities (in N. Ireland, the Health and Social Services Board (HSSB)) or its proper officer (in Scotland, the designated medical officer; in Northern Ireland, the HSSB Director of Public Health). Key provisions include:

- powers to seek orders from a justice of the peace (sheriff in Scotland or resident magistrate in N Ireland) requiring a person to be medically examined and to be removed to and detained in hospital
- powers for the local authority/its proper officer (or equivalents) to request a person not to work with a view to preventing the spread of infection, to require a child who has been exposed to infection not to attend school and to place restrictions on children's places of entertainment
- the creation of criminal offences where people expose others to the risk of infection
- some powers to require the provision of information to help control the spread of disease

6. In Scotland those powers are available for infectious diseases generally. In other parts of the UK, the Acts relate to specific diseases and generally to people suffering from them – i.e. have been infected and gone on to develop symptoms – not to those thought to have been exposed and therefore potentially infected. However, regulation-making powers in the Acts can be used to make provision in respect of an infectious disease, whether or not specified. For example, under Section 13(1)a of the 1984 Act, regulations can be made "with a view to the treatment of persons affected with any epidemic, endemic or infectious disease and for preventing the spread of such diseases".

7. Public health legislation contains no specific provisions for the notification of influenza but regulation making powers could be used to introduce that requirement. Generally this legislation does not cover submission of samples or laboratory reporting although sections of the NHS Act 1977 could apply.

8. Under the Civil Contingencies Act a range of provisions could become available if the situation causes or may cause amongst other things 'loss of human life, human illness or injury or disruption of services relating to health' (Section 19 (2)- a,b,h), in the event of a pandemic affecting the UK.

9. Those powers allow senior Ministers of the Crown to arrange by Order in Council to make emergency regulations where:

- an emergency has, is, or is about to occur

- it is necessary to make provision for the purpose of preventing, controlling or mitigating an aspect or effect of the emergency
- the need for such provisions is urgent.

10. Amongst other things those regulations may:

- prohibit or require, or enable the prohibition or requirement of, movement to or from a specific place
- prohibit, or enable the prohibition of, assemblies of specified kinds, at specific places or at specified times
- prohibit, or enable the prohibition of, travel at specified times
- prohibit, or enable the prohibition of, other specified activities
- create an offence of failing to comply with a provision of the regulations or direction or order given under them or obstructing a person in the performance of a function under the regulations

Summary

11. There is no international or national legislation aimed specifically at influenza pandemics and, given its seasonal nature, a requirement to notify any outbreak of the virus could be both onerous and ineffective. Voluntary agreements and professional networks provide mechanisms for identification of new events and changing trends.

12. Existing public health legislation and emergency powers can be utilised to limit and control the spread of the disease.

ANNEX F

Surveillance

Surveillance strategy

Previous influenza pandemics have varied widely in their characteristics and impact, and much has changed demographically since the last pandemic in 1968/69. The estimates used in the UK Pandemic Plan to describe the disease, its likely progression and impact and the possible effectiveness of interventions, are the best that the historic data can provide for planning purposes at the current time, but may be incorrect. Thus, data and information will be essential throughout a pandemic:

- To describe the disease and its epidemiology
- To characterise and monitor the virus
- To monitor the spread and impact of the pandemic
- To inform vaccine development
- To better anticipate the likely epidemic curve and impact
- To inform vaccine distribution decisions, treatment guidelines and wider policy decisions
- To assess the effectiveness, and any adverse effects, of interventions

1. The influenza monitoring system entails different requirements at different stages. It is therefore crucial that the surveillance be flexible as well as capable of fulfilling the varying requirements.

2. Underpinning all national and regional efforts during a pandemic, is the inter-pandemic period of international collaboration. This enables the earliest possible characterisation of the virus, associated disease risk factors and vaccine development.

3. The initial stages of a pandemic in the UK require surveillance which is sensitive enough to be able to pick up the first few cases or outbreaks. This requires:

- strong surveillance at anticipated areas of origin (for example well established links with animal influenza surveillance networks)

- a heightened, national awareness – especially at first points of contact such as GPs – of the potential impact of influenza together with knowledge of the risk factors and the need for taking specimens

- reliance on a quality laboratory network, capable of receiving, analysing and feeding back results within tight time limits

4. The emphasis in these initial stages, most probably before a vaccine has been developed and is being distributed, is on characterising the virus and understanding the epidemiology of the disease. One of the first priorities will be to identify high risk groups to inform decisions on antiviral drug distribution and eventual vaccination policy. Another will be to monitor the administration of antiviral drugs to check for any resistance and to follow the immune status of those affected in order to anticipate characteristics of a second wave of the epidemic. It may also be decided in these early stages to attempt to contain the virus but this will only be possible under certain conditions.

5. As the pandemic progresses and the number of cases increase, sensitive surveillance will become less necessary. The emphasis will move towards monitoring both the burden of the pandemic, determining the immunogenicity and safety of the vaccine, and measuring levels of direct and indirect protection. Different companies will produce different vaccines which may have different effects; immunogenicity status, vaccination status and adverse events will all need to be monitored. As the numbers of cases rise, the quantity of antiviral drugs and of any vaccine administered must be monitored as well as the impact on the health system, including: numbers of hospital beds being used/required, numbers of healthcare staff affected and unable to provide care, numbers of deaths, consequences on other healthcare areas, and so on. With the peak of the pandemic over and a drop in the number of cases, the surveillance will again shift towards more sensitive case detection to mop up remaining clusters and prepare for the onset of a possible next wave.

6. It is clear that no one data collection system can provide the full scope of the information that will be necessary. Furthermore, much of the information is already available and routinely monitored for other purposes, such as seasonal influenza or vaccine uptake. Pandemic influenza surveillance systems have been ‘piggybacked’ onto existing systems with some adjustments which include standardised information, synchronised reporting frequencies, and smooth data collection and transition networks.

Data collection

The key underlying principles of data collection that enable the necessary flexibility and manoeuvrability are that:

- Data collection is kept as simple as possible, to avoid unnecessary burden or duplication of effort, at a time of heightened activity for people whose main priority will be delivering health care or other essential services;
- Data collection is comparable, consistent & complete;
- Data collection is timely – many people at all levels (local, regional, and national) will require timely information to inform their decision-making during the response. The public will also expect to be kept up to date and require timely advice on the evolving situation.

Data reporting and responsibilities

Some of the data, for example number of cases, will need to be reported on a daily basis, some data will be collated weekly. Most data will need to be provided on a national basis, whereas other, more specified information will be collected through sentinel surveillance schemes.

The essential data flow will be from GP practices, hospitals and other health care centres, via PCTs, HPUs, and SHAs, to the DAs, HPA, MHRA and DH. The MHRA will continue to monitor adverse events through its "Yellow card" system. The HPA will collate, analyse and interpret the epidemiological and virological data. These organisations will then forward this information on to the DH to incorporate the data regarding the impact on the health system. This will then be reported onto the Civil Contingencies Secretariat, which in turn will relay the information to the Cabinet Office for dissemination across Government.

A modified version of the current Vaccine Tracking Programme (see Table 1) is being set up to manage this data flow for pandemic flu. It will provide a single web portal which will enable a range of data feeds to be received, from GP practices upwards and in real time, as well as making data available at appropriate levels (PCTs, SHAs, HPA, DAs, DH) through a range of reports – including geographic mapping – and providing access to other information sources and sites such as RCGP or QRESEARCH.

The HPA Centre for Infections coordinates the epidemiological and virological surveillance systems and their emergency preparedness plan can be found at:

http://www.hpa.org.uk/infections/topics_az/influenza/fluplan.htm.

The Department of Health has collaborated on this work and has also worked on the collation of this information with that of other systems to give the whole picture of the pandemic. Further information on the systems involved is outlined below.

Feeding back information to the public and the media is described in Annex I – Communications Plan.

Current systems for influenza surveillance

Core surveillance in a pandemic will be through current routine influenza monitoring systems. The following paragraphs outline the different types of existing arrangements.

1) International surveillance

As an influenza pandemic is most likely to emerge outside the UK and possibly in Southeast Asia, the UK will be heavily dependant on data collated from the source country and other countries affected before the pandemic reaches the UK. The UK contributes in several ways to this surveillance, which is co-ordinated globally by the WHO. Regular reports appear in the publication Weekly Epidemiological Record and on the WHO website. The UK houses one of the four WHO Collaborating Centres for Reference and Research on Influenza – the National Institute for Medical Research in London. In addition, the UK has contributed funding to assist in developing more robust clinical and virological surveillance in areas where it is required such as China and South East Asia.

Experience during the Severe Acute Respiratory Syndrome (SARS) epidemic demonstrated the effectiveness, once outbreaks have been identified, of early international involvement in field epidemiological investigations into the outbreaks, and collaboration between infectious disease epidemiologists and modellers to agree the key parameters. A similar process is likely in a flu pandemic. At this stage, secondment of UK experts to the WHO field investigation teams may be particularly beneficial.

The European Commission funded European Influenza Surveillance Scheme (EISS) combines clinical and laboratory reports from all European Union Member States, the UK being an active participant. Data are accessible on the EISS website. The recently established European Centre for Disease Prevention and Control (ECDC), based in Stockholm, has announced that one of the Centre's first priorities is to reinforce influenza surveillance and alert systems across Europe, including strengthening laboratory networks.

International surveillance of influenza viruses in birds and other animal reservoirs of the virus is also strong. International collaboration exists at

both European level as well as globally – avian influenza is a notifiable disease both at national level and to the European Commission. The World Organisation for Animal Health (OIE) and the Food and Agriculture Organisation (FAO) play coordinating roles.

2) Veterinary surveillance

Proactive surveillance for avian influenza in birds is made extremely difficult by the speed with which the disease affects and then kills them. This makes monitoring avian influenza in wild bird populations impracticable. The most sensible measures available are to limit contact between wild and commercial or domestic flocks. DEFRA has a detailed contingency plan that details the actions necessary in the case of an outbreak of avian influenza. These include rapid virological identification, strict containment of the infected flock and culling measures. Monitoring influenza in other potential animal reservoirs follows a similar procedure. Should an animal be identified through laboratory tests as positive for influenza then quarantine, culling and notification measures would be initiated. For further information please see: **http://www.defra.gov.uk/animalh/diseases/notifiable/disease/avianinfluenza.htm**

In the UK, the National Institute for Medical Research (NIMR) as a WHO Influenza Collaborating Centre is involved in the ongoing characterisation of circulating animal influenza viruses.

3) Surveillance in the UK

Routine surveillance systems that will be used in an influenza pandemic are outlined below and summarised in Table 1. Data requirements during an influenza pandemic are listed in Table 2. Routine influenza data are currently collated by the HPA, on a national basis and published weekly during the normal influenza season.

a) Clinical surveillance

i) GP consultation data

Influenza is essentially a clinical diagnosis (i.e. not usually confirmed by laboratory tests). Surveillance has been based for many years on the number of patients who consult their GP with influenza-like illness (ILI). In England and Wales, 'spotter' practices report to The Royal College of General Practitioners (RCGP) Weekly Returns Service, the results being taken as representative for the country. Scotland and Northern Ireland run similar schemes. RCGP reports are produced twice weekly (one main, one interim) on the previous week's data, providing total new cases by age. These data have proved to be a reliable way of monitoring the

onset, magnitude and duration of seasonal influenza and also allow for comparisons against previous years.

ii) Patients contacting the telephone helpline NHS Direct (and regional equivalents)

These schemes work to algorithms designed to make their data relating to respiratory symptoms as discriminative as possible. They may give an earlier indication of pandemic influenza activity than the GP consultation schemes, and can provide daily information. However, diagnostic accuracy is likely to be less than the GP schemes, and numbers of calls, although increasing, are far lower than the numbers consulting a GP. Nonetheless this does give some indication of the geographic spread of the pandemic as well as a measure of the severity of cases.

iii) Outbreaks and unusual cases or clusters of cases

The HPA receives reports of outbreaks of respiratory illnesses (especially in closed communities such as care homes) and unusual clusters such as among laboratory or health care workers or people who have recently travelled abroad, which might alert to an unusual event, or one requiring intervention. These reports will be incorporated into the pandemic monitoring system.

iv) Vaccine Tracking Programme (VTP)

The Vaccine Tracking Programme is a web portal that was designed and rolled out in September 2004 as a tool to manage the (England only) influenza and pneumococcal aggregate vaccine uptake data returns from GPs to PCTs and SHAs to the HPA and through to the DH. Following on from the extensive testing and experiences of the flu and pneumococcal returns, the tool is being modified to provide a pandemic influenza portal incorporating a reporting instrument for use at both GP and PCT level during a pandemic.

b) Virological surveillance

In conjunction with others, the HPA has developed a pandemic virological surveillance strategy. Integral to this strategy is the maintenance of a UK capability and capacity to identify novel influenza strains, and the ability to roll out diagnostic capability to a network of peripheral laboratories if required.

i) Routine laboratory reports

The HPA collates reports of positive laboratory tests for influenza from routine NHS laboratories and the National Influenza Reference Laboratory, from patients who have been investigated for respiratory

infection. These give a clear indication of when influenza is circulating in the community, and increase the reliability of the clinical data. This data is especially good for more severe cases.

ii) Virological data linked to clinical data (sentinel surveillance and case investigation)

Two separate schemes involve GPs routinely sampling a set number of their patients with respiratory symptoms to obtain laboratory confirm of the diagnosis. This again adds to the accuracy of clinical data and the depth of knowledge of the virus, associated diseases and treatment.

iii) Enhanced surveillance of specified patients

As a result of the SARS and avian influenza outbreaks in Asia, clinicians are asked to send diagnostic samples from patients presenting with respiratory symptoms who have recently travelled to affected (or for SARS, previously affected) areas and who meet the criteria specified in an algorithm provided by the HPA. These samples are sent to the National Influenza Reference Laboratory if there is any suspicion of an unusual infecting agent.

iv) Ongoing development

Virological surveillance to develop monitoring of antiviral susceptibility of influenza viruses is being developed by all parties concerned.

c) Bacteriological

Most infective complications of influenza are due to secondary bacterial infections such as bronchitis and pneumonia. Monitoring of the causative agents is not routinely undertaken for influenza, other than as part of overall surveillance of the causes of bacteraemic community-acquired pneumonias. This is being addressed by the HPA in anticipation of a pandemic as data on the relative frequency of the different bacterial causes of influenza-related complications along with their antimicrobial susceptibility will be needed to guide therapy choices.

d) Vaccine uptake

Data are collected from all PCTs on uptake of vaccine in the risk groups routinely recommended for vaccination in the annual influenza immunisation programme, including health care workers.

e) Deaths

Deaths associated with influenza are often due to other causes such as respiratory or cardiac complications. Use of certified cause of death therefore considerably underestimates deaths from influenza. The better marker is ‘Excess deaths’ over and above those expected. This

information is provided by the Office for National Statistics (ONS) seven days in arrears due to the interval between death and registration.

f) Monitoring impact on health services

The NHS has a well-established system in place for monitoring pressures on the health service, particularly in winter. Since influenza is one of the routine winter pressures for which the system is designed, it is entirely appropriate for an influenza pandemic. The data will continue to be collated at the DH.

g) Other sources of data being integrated

i) QRESEARCH

The QRESEARCH database currently contains data from 468 general practices throughout the UK with records for 3.3 million current patients and 4 million past patients. The general practices are spread throughout England, Wales, Northern Ireland and Scotland and cover every Strategic Health Authority Area.

ii) Cases in boarding school children

A number of independent schools contribute to this scheme, which gives an indication of activity among children. Reports are weekly, expressed as rate/1000 by age group. This type of system could have a role to play in the virological identification of any circulating or imported virus.

Table 1 Data sources for influenza surveillance in the UK

Data type	Organisation	Description
Clinical	Royal college of general practitioners (RCGP) Weekly Returns Service, (**England and Wales**).	Twice weekly morbidity data derived from 73 sentinel GP practices. Each new consultation is recorded and defined by using diagnostic guidelines. (Rates per 100,000 population for influenza and flu-like illness).
	HPA Communicable Disease Surveillance Centre (CDSC) Northern Ireland. (**Northern Ireland**).	Weekly morbidity data derived from sentinel GP practices for influenza and flu-like illness, and call rates for all causes to out-of-hours GP co-operatives.
	HPA Communicable Disease Surveillance Centre (CDSC) Wales. (**Wales**).	Weekly morbidity data derived from sentinel GP practices for influenza (Rates per 100,000 population for influenza).
	Health Protection Scotland (SCIEH) (**Scotland**).	Weekly morbidity data derived from sentinel GP practices for each consultation for influenza-like illness. (Rates per 100,000 population for influenza).
	NHS Direct. (**England and Wales**).	Weekly total call, cold/flu and fever call rate derived from a 24-hour nurse advice and health information service.
	Medical Officers of Schools Association (MOSA) (**England and Wales**).	Weekly rates per 1000 boarding school children for influenza and flu-like illness.
	Influenza Vaccine uptake monitoring. Influenza/ Respiratory virus section, HPA Centre for Infections (CFI), Colindale. (**England**).	Monthly data collected from October to December derived from general practices through influenza immunization coordinators in primary care trusts (PCTs before forwarding to CFI for data at the regional and national level).

Table 1 Data sources for influenza surveillance in the UK

Data type	Organisation	Description
Clinical	QRESEARCH	This is a collaborative project between the HPA and the University of Nottingham Division of Primary Care to pilot a national, primary care surveillance system. The database contains information on the health needs, risks, care and outcome for a current population of over 3.3 million patients in 468 practices. The data are anonymised.
Virology	Respiratory Virus Unit (RVU), HPA Centre for Infections (CFI), Colindale. (**UK**).	Analysis of influenza strains: sub-typing, antigenic and genetic Characterization of viruses referred from UK laboratories (HPA and NHS).
	RCGP/CFI Virological surveillance scheme. (**England**).	Community-based sampling by GPs participating in the RCGP spotter practice scheme.
	CFI virological surveillance of influenza scheme (**England and Wales**)	Weekly report from community-based sampling by 45 sentinel GPs.
	HPA/NHS laboratory reports. (**England and Wales**).	Positive respiratory virus specimens routinely reported to CFI from NHS and HPA laboratories.
Mortality	Office for National Statistics (ONS) (**England and Wales**).	Weekly registration of deaths by age and cause.
Outbreak		Information on outbreaks of influenza and other respiratory illness reported to the HPA Influenza/Respiratory Virus Team, Centre for Infections, Colindale.

Table 1 Data sources for influenza surveillance in the UK

Data type	Organisation	Description
Vaccine uptake	Vaccine Tracking Programme (VTP) Department of Health	Collects national vaccine coverage at GP practice level
Adverse reactions	MHRA, Yellow Card reports	Information on the number of adverse events reported following administrations of antivirals or influenza vaccine.

Table 2 (revised) Data requirements in an influenza pandemic

Descriptive epidemiology and variables required to inform real time modelling		**Surveillance system**
Incubation period	Clinical attack rate	Contact tracing Serological surveillance Virological surveillance Outbreak investigation Hospital surveillance Hospital surveillance
Symptomatic period	Overall attack rate	
Infectious period	Mortality rate	
Total number of cases	Risk of developing complications	
Number of cases that developed complications		
Number of hospital admissions		
Number of hospital admissions due to flu		
Length of hospitalisation		
Age breakdown		
Geographic breakdown		
Risk group breakdown		
Temporal breakdown		
First case detection		
Total number of cases		Contact tracing Outbreak investigation
Total number of cases hospitalised		
Virological information		

Table 2 (revised) Data requirements in an influenza pandemic

Data to inform vaccine development		**Surveillance system**
Genetic characterisation of the virus		Virological surveillance Contract tracing Linked clinical-lab sentinel surveillance HPA Outbreak investigation
Cross reactivity with other viruses		
Immunogenicity data		
Monitoring to inform operational decisions		
Number of antiviral courses administered		Pandemic Influenza Portal Bacterial surveillance Linked clinical-lab sentinel surveillance HPA Contact tracing
Number of vaccine doses administered		
Number of new reported cases of ILI		
Number of total cumulative reported cases of ILI		
	Rate of new GP consultations per 100,000 population	
	Estimated number of cases of ILI per GP consultation rate	
	Estimated case hospitalisation rate	
	Estimated number of hospitalisations per 100,000	
	Relative distribution of microbial complications	
	Susceptibility of microbial complications	

Table 2 (revised) Data requirements in an influenza pandemic

Monitoring the effectiveness of interventions		**Surveillance system**
Antibacterial resistance		Virological surveillance Bacterial surveillance MHRA Yellow Card Scheme Linked clinical-lab sentinel surveillance HPA Outbreak investigation Pandemic Influenza Portal
Antibacterial susceptibility		
Antiviral susceptibility		
Vaccine efficacy		
Immunogenicity		
Adverse events following immunisation		
Vaccination coverage		
Monitoring the impact on health services		
A&E status [closed, diverted, overloaded [12+ hour trolley wait], OK]		STEISS Winter Pressures Report Pandemic Influenza Portal Hospital surveillance
Urgent Operations cancelled		
Operational difficulties [Ambulance queues, Reductions in elective surgery, Critical Care transfers, reported Operational difficulties]		
Antiviral stocks [adult/paediatric]		

ANNEX G

INFLUENZA VACCINES

Current vaccine development and production

Influenza vaccines currently in use are trivalent, containing representative recent variants of an influenza A (H1N1), A (H3N2) and B virus. The annual cycle of vaccine production starts in February each year, when the vaccine composition is recommended by WHO and ratified for use in the EU by the Committee for Human Medicinal Products (CHMP). Suitable 'seed viruses' are identified and developed which are suitable for manufacture and grow well in eggs. Vaccine viruses are grown in embryonated hens' eggs and the infected allantoic fluid harvested. The viruses are purified, inactivated and further treated to produce either a whole virus, split or subunit vaccine. Currently only split and subunit vaccines are licensed in the UK although a whole virus vaccine may be licensed later this year. The lead time for vaccine production is approximately 6 months.

Numerous clinical trials have confirmed the effectiveness of influenza vaccines in reducing clinical illness, hospital admissions and deaths. Following a strain change, the licences for EU vaccines have to be varied. In support of any strain changes, each vaccine is studied in a small number of healthy young and elderly adults to evaluate its reactogenicity and immunogenicity.

Vaccine development and production in the event of a pandemic

There will be uncertainty about which influenza subtype will cause the next pandemic until a new strain has been confirmed to be causing sustained person to person spread.

Once a pandemic virus is identified, it is anticipated that there will be worldwide efforts (co-ordinated by the WHO) to develop monovalent vaccines. In view of past experience it is likely to take at least 6 months before the first doses of vaccine are available. Current research is directed at speeding up this process. It is expected that the various manufacturers of influenza vaccine will develop their own product according to their usual production methodology.

Type of vaccine, dose and dosing schedule

Past and recent clinical experience has shown that the dose used in routine influenza vaccines (15µg of influenza haemagglutinin per strain) is unlikely to provide adequate protection in the pandemic situation. In

unprimed populations it may be necessary to use one dose to prime and at least one more dose to boost and to maintain immunity throughout the duration of a pandemic. Thus the time needed to develop an initial protective immune response is likely to be longer than normal.

Furthermore, there is evidence that conventional split or subunit vaccines may be less immunogenic than whole virus vaccines in a pandemic situation. In order to improve the immune responses and also possibly reduce the amount of vaccine antigen needed, the use of adjuvants may be beneficial. (A proviso is that if the pandemic is caused by a virus that has previously circulated (e.g. an H2N2 virus), a conventional vaccine dose should be immunogenic in older people.) Thus, although information from new research may help, it is difficult to formulate a clear immunisation strategy in advance of a pandemic.

Unless the strategy of developing a "mock-up" vaccine is employed in advance of a pandemic (see below), it is possible that the dosage regimen of a pandemic vaccine that is presumed to be necessary may be unlicensed at the onset of a pandemic. This could mean that unlicensed vaccines have to be used until enough data have been amassed to support formal licensure.

The Department of Health recently announced its intension to purchase 2 million doses of H5N1 vaccine. The vaccine will be suitable for research purposes, and could be offered to frontline healthcare workers if the risk of a pandemic increases.

Production capacity

The capacity for vaccine production will depend upon many factors. The overall world-wide manufacturing capacity is based on the demand for annual routine influenza vaccines. This varies considerably between countries. National immunisation policies are based on selective immunisation of identified risk groups. The UK achieves high coverage in the main risk group (those aged 65 and over) and delivers nearly 13 million doses of trivalent influenza vaccine each year (i.e. about 20-25% of the total population).

If a monovalent vaccine is used, vaccine yield will be increased by a factor of three. If a whole virus vaccine is used, normal losses during processing of a subunit vaccine will be avoided and yield can be increased by a factor of two (i.e. net gain, 6 fold). However, two (or even more) doses of vaccine may be needed, halving the effective yield of vaccine (i.e. net gain, perhaps 3 fold). Current research suggests that use of an adjuvant may result in half the normal dose being immunogenic (i.e. net gain, 6 fold). The number of doses currently produced could therefore be potentially increased by a factor of up to 6 if an adjuvanted whole virus vaccine is used.

All these strategies will be kept under review as and when new information about a pandemic or potentially pandemic virus becomes available.

Rate limiting factors in vaccine availability

Rate limiting factors for the availability of vaccine are likely to be:

- Availability of hens' eggs
- Development of a suitable vaccine seed virus
- The growth rate of the vaccine virus in hens' eggs
- The time for development of reagents for vaccine potency tests
- Licensing of new vaccines (but this might be optional in case of dire emergency)
- National authority batch release tests
- Agreement on indemnity issues on production and use of vaccine.

New developments in vaccine technology may significantly affect our ability to immunise the population against pandemic influenza. Steps that can be considered to speed up vaccine availability in future are as follows:

- Develop safe and productive vaccine strains by genetic modification using reverse genetics technology. This process is likely to be more reliable than conventional techniques. There are no GM influenza vaccines currently licensed, but steps could be taken now to license the principle of GM vaccine strains. The commercial use of reverse genetics is subject to Intellectual Property control. This has been recognised by the WHO and manufacturers. (Potential time saving, approximately 2 months)
- Libraries of vaccine strains and corresponding reagents for vaccine testing could be produced for different avian influenza subtypes in advance, ready to use in vaccine manufacture. Assuming one provided a reasonable match with a pandemic virus strain, vaccines could be made (depending on availability of eggs) which, even though it may not be an exact match with the pandemic virus, may protect against the worst consequences of infection. Its use could be phased out as vaccines from the pandemic virus were produced. Development of reagent libraries is already in progress in the EU and the USA. (Potential time saving, approximately 5 months.)

- The first (limited) doses of vaccine could be made by inactivation of the unmodified pandemic virus after growth under stringent biological containment conditions. This vaccine could be used to immunise personnel who may be exposed to a pandemic virus before the rest of the UK (e.g. vaccine manufacturers, laboratory staff working with the pandemic virus at HPA, NIMR, and NIBSC) and other key personnel. (Potential time saving, approximately 3 months.)

- In order to shorten the licensing procedure for a new pandemic vaccine, manufacturers could prepare prototype pandemic vaccines in advance and submit a 'mock' pandemic influenza vaccine dossier for approval (e.g. covering new immunisation schedules, adjuvants, use of vaccines licensed elsewhere, GM vaccine strains, the need for clinical trials; streamlined national authority batch release testing). In the case of a pandemic, the strain in the vaccine could then be supplanted (if necessary) and the final pandemic vaccine could be approved by a fast-track variation. The CHMP has already adopted guidance and procedures to cover this approach (Potential time saving, 1-2 months.)

- If eggs are not available for pandemic vaccine production, it may take several months to secure extra supplies. Contracts could be put in place to secure year-round supplies of eggs (accepting the large wastages likely most years).

- Alternatively, manufacturers of vaccines should be encouraged to develop and license vaccines using mammalian cell culture technology, which is far more responsive to emergency demand. In an emergency, mammalian cell culture vaccines could be produced quicker and in larger quantities than egg-based vaccines. Cell culture vaccines are now licensed for use in the Netherlands. For other manufacturers, additional investment may be required to change to cell culture vaccine production, but this should be considered. (Potential time saving, 0-6 months, depending on availability of eggs.)

- Recent research with H5N3 influenza vaccines has demonstrated the improved immunogenicity of adjuvanted vaccines. It may be possible to use half or quarter strength vaccine doses by the use of adjuvants.

- Time may also be saved by prior negotiation of contracts with vaccine manufacturers. There may be a European Union component of vaccine supply negotiations.

- One of the issues that delayed the mass 'swine flu' immunisation campaign in 1976 in the USA was the need to negotiate for product

liability i.e. ensuring a guaranteed market for the vaccine and organising who would take liability in the event of adverse reactions. Vaccine manufacturers would not begin full-scale vaccine production until such agreements were in place. Time could be saved by addressing these issues in advance.

Live influenza vaccines are not yet licensed in the EU and expert opinion would be very much against developing a live attenuated pandemic vaccine in these circumstances.

Vaccine policy, strategy and delivery

Although antiviral agents are now available for influenza therapy and prophylaxis, there are a number of limitations to their use. Immunisation remains a priority, as and when vaccine becomes available.

Immunisation with appropriately formulated influenza vaccine can be expected to reduce the impact of a pandemic, particularly among the population groups most at risk of serious illness or death from influenza. However, as vaccine is likely to be in short supply and demand will be high in the UK and worldwide, vaccine must be administered as it becomes available to predetermined priority groups. The reasons for the priorities must be defensible. The public will need information about vaccine not being generally available.

The priority groups for immunisation will be based on a number of factors, including the need to maintain the elements of community infrastructure in order to carry out the pandemic plan; to limit mortality among high-risk groups; to minimise social disruption and economic losses; to reduce morbidity in the general population. The priority groups will be subject to review, depending on the epidemiology and clinical features of the new pandemic virus and depending on availability of vaccine. It is likely that advice will be given by WHO about priority groups for immunisation, as soon as epidemiological data from the emerging pandemic is obtained. The following table suggests priority groups for immunisation, according to gradually increasing availability of vaccine.

Priority 1 group

Healthcare staff with patient contact (including ambulance staff) and staff in residential care homes for the elderly.

Advantage: Disruption of vital health care delivery is minimised

Priority 2 group

Providers of essential services e.g. fire, police, security, communications, utilities, undertakers, armed forces.

Advantage: Vital community functions which would be affected by mass absenteeism would be minimised.

Priority 3 group

Those with high medical risk e.g. chronic respiratory or heart disease, renal failure, diabetes mellitus or immunosuppression due to disease or treatment, women in the last trimester of pregnancy.

Advantage: Consistent with normal influenza immunisation policy. Demand for health care will be minimised.

Priority 4 group

All over 65 years of age

Advantage: Consistent with normal influenza immunisation policy. Demand for health care will be minimised.

Priority 5 group

Selected industries

Advantage: Maintenance of essential supplies of e.g. pharmaceuticals. Minimise disruption to the economy.

Priority 6 group

Selected age groups, depending on advice from WHO eg children

Advantage: Minimise spread by those most likely to transmit virus and the impact in population groups showing highest impact

Priority 7 group

Offer to all

Advantage: Prevent illness and minimise the impact of pandemic in the UK

Operational plans for delivery of an immunisation programme will be developed during the interpandemic period. These plans will need to take account of the likelihood of two doses being needed about 21 days apart for optimal protection.

Vaccine monitoring

Even if the pandemic vaccine has been the subject of a prior "mock-up" dossier, there will be very limited data on safety and immunogenicity and no data on efficacy. In addition, the "mock-up" vaccine strain may differ from the pandemic strain so that there will be no such data with the final product before it has to be used.

Thus, Regulators have made it clear that, in addition to the usual pharmacovigilance measures to assess vaccine safety during use (such as the yellow card scheme operated by the MHRA/CSM in the UK), the immunogenicity and efficacy of pandemic vaccines (there will be several different ones from different companies in use simultaneously) will need to be assessed during actual use. This will be important since lessons learned during the first months may demonstrate the need for a different regimen and/or further doses to be given to achieve optimal efficacy. Also, following subsets of vaccinees for immune responses may show that further doses should be given to cover an anticipated "second wave" of the pandemic.

In the case of a pandemic and the use of vaccines that have been subjected to a minimum of clinical testing, it will be particularly important that the monitoring of safety is pre-planned and comprehensive. In addition, there would be an advantage in UK bodies such as the HPA having plans in place to conduct prospective evaluations of vaccine safety and effectiveness during the pandemic. All the data generated within countries or regions will need to be shared rapidly.

ANNEX H

Antiviral agents for Influenza

Introduction

When an influenza virus is circulating in the community antiviral agents can help to lessen the severity of illness, reduce deaths, contain spread and protect key workers. Whilst those drugs are frequently prescribed to treat seasonal influenza they have not been available in any previous pandemics and strategies for their most effective use are therefore still developing.

In addition to the background information and summary contained in this Annex, more detailed information on the storage and distribution of national antiviral stocks for pandemics and guidance for health planners on providing patient access can be found on Health Departments' websites.

Available drugs

Three antiviral agents are currently licensed for the treatment of influenza in the UK – two of which are also licensed for prophylaxis:

Amantadine

Amantadine is an 'M2 inhibitor' active only against influenza A (it has no activity against influenza B). It is taken orally, excreted through the kidneys and licensed for the treatment and prophylaxis of influenza A.

Amantadine is not licensed for use in children under 10 and contraindicated in individuals subject to convulsions, a history of gastric ulceration/severe renal disease and when pregnant or breast-feeding. It should be used cautiously in individuals who are in confused or hallucinatory states, suffer underlying psychiatric conditions, or have liver, kidney or cardiovascular disorders.

It has a number of drug interactions and some strains of influenza A virus rapidly develop resistance when exposed to amantadine. This is reported to be more common when the agent is used for both prophylaxis and treatment in the same household.

The treatment dose is 100mg daily for 4-5 days for treatment and 100mg for up to 6 weeks for prophylaxis. Higher incidence of adverse reactions associated with higher doses have been reported.

Zanamivir

Zanamivir is a neuraminidase inhibitor taken using an inhaler (diskhaler). Virtually none is absorbed from the respiratory tract. It is licensed for the treatment of influenza A and B in people aged 12 or older, if given within 48 hours of onset of symptoms and when influenza is circulating in the community. Zanamivir is contra-indicated in women who are pregnant or breast-feeding and should be used cautiously in people who have unstable chronic illness or compromised immune systems.

The dose is 10mg by inhalation twice daily for 5 days. Some elderly and disabled people may have difficulty using the diskhaler.

Oseltamivir

Oseltamivir is an orally administered neuraminidase inhibitor, excreted mainly through the kidneys. It is licensed for the treatment of influenza A and B in people over one year of age, within 48 hours of the onset of symptoms and when influenza is circulating. It is also licensed for the prophylaxis of influenza A and B in those aged 13 years and over when influenza is circulating.

The treatment dose of 75mg twice daily for 5 days must be adjusted for children according to weight and for people with severe renal impairment. The recommended dose for prophylaxis is 75mg daily for at least 7 days following contact with influenza and for up to 6 weeks during a community outbreak.

Resistance to neuraminidase inhibitors has been documented.

Guidance on the use of antivirals in the treatment of seasonal influenza

The National Institute for Clinical Excellence (NICE) has issued guidance on the use of antivirals for the treatment of influenza in inter-pandemic years. Influenza vaccination remains the first line of protection. NICE recommends that amantadine should not be used in the treatment of influenza and that zanamivir and oseltamivir should not used to treat flu-like illness in people who are otherwise healthy.

Neuraminidase inhibitors can be expected to shorten illness by around one day and reduce complications in high-risk patients. They are recommended for treating flu-like illness in those considered to be at risk of developing complications when influenza is circulating, providing treatment can commence within 48 hours of symptoms starting.

Those considered 'at risk' are in at least one of the following groups:

- aged 65 or over
- people with long term ('chronic') lung disease – including asthma and chronic obstructive pulmonary disease
- heart disease – not including uncomplicated hypertension
- long term kidney disease
- diabetes
- an immune system that does not work well

Guidance on the use of antivirals in an influenza pandemic scenario

A suitable vaccine is very unlikely to be available in the early stages of any influenza pandemic and its development is likely to take some time. In such a scenario, antiviral agents can be used to lessen the severity of illness, reduce the number of deaths and help protect key workers. Therefore, ensuring that available drug stocks are stored, distributed and used effectively over the entire pandemic period are central to the provision of health care.

NICE guidance does not apply in an influenza pandemic, but the principles for the use of antivirals will be consistent with the overall principles of managing a pandemic: to minimise serious illness and deaths, maintain essential services and minimise societal disruption.

The level of antiviral stock available to deal with seasonal influenza is likely to be completely inadequate is such circumstances. Once a pandemic has started, high international demand for antivirals can be anticipated and rapid re supply would be unlikely. UK Health Departments are therefore establishing national stockpiles of the drug oseltamivir (Tamiflu) specifically to provide for **patient treatment**.

Guidance suggests that prudent influenza pandemic plans should assume a 25% clinical attack rate and those stockpiles – eventually comprising 14.6 million courses – will provide for the treatment of all patients with influenza given an attack at or below that rate. It should be emphasised that those national stockpiles provide no allowance for prophylaxis to protect key workers or maintain business continuity.

The actual attack rate and groups that are being worst affected can not be determined until the virus starts circulating, therefore strategies for the use of antiviral agents need to be flexible and severe pressure on available stocks expected. In the initial stages of a pandemic all patients

with influenza will be offered antiviral treatment if that is likely to be effective and stock consumption closely monitored. Any subsequent national decisions required on clinical priorities will be informed by expert advice and epidemiological information as the pandemic develops.

Arrangements for making antiviral drugs available to patients need to be an integral part of local health plans for pandemic influenza. To inform, support and encourage that planning, specific guidance on storage, distribution and patient access to antiviral drugs from those stockpiles is included on Health Department websites. That guidance will be reviewed regularly and revised to reflect emerging scientific evidence, information or other developments.

ANNEX I

Communications Plan

Background and context

This communications plan supports the UK Health Department's Influenza Pandemic Contingency Plan

It is set in the context of there being no vaccine available during the initial stages of an influenza pandemic and a growing stockpile of antiviral drugs.

The communications plan offers messages to the public, health professionals and key stakeholders to be used in conjunction with the publication of the Pandemic Influenza Contingency Plan and during the inter-pandemic period (the period in advance of a pandemic occurring).

Stocks of antiviral drugs are being established and the subsequent messages are modified to reflect their availability as stocks build up. However, the strategy needs to be flexible to take account of the availability and effectiveness as well as emerging information about the way the pandemic is developing.

The Communications Plan maps out a strategy based on the expected evolution of a pandemic, and includes the command and control structure that would be used to implement the communications plan if there were pandemic flu in the UK.

Information lead

The primary communications source will be the Department of Health, which is a central government authority and directly responsible for public health.

The Department of Health will work closely with the Cabinet Office, other government departments, devolved administrations and the HPA to deliver a nationally coordinated communications plan. Communications from the NHS will relate to the provision of local services or treatment.

SHA comms leads

SHAs will play a key role in communications with NHS services in both interpandemic and post pandemic periods. Authorities will be provided with materials to support local NHS trusts in preparing for a possible flu pandemic and throughout a pandemic period.

Materials and supportive arrangements will be developed in association with the specific NHS organisations and will include FAQ, stock and locally tailored press notices, key fact sheets and access to regional spokespersons

NHS Direct

NHS Direct will play an important part in the public information strategy, providing helpline services for the duration of a pandemic. NHS Direct staff will also provide feedback to DH about new messages and materials that need to be developed to respond to public needs.

NHS Direct's normal telephone number – 0845 46 47 would be used in such an event, although the NHS Direct Online website (www.nhsdirect.nhs.uk) and NHS Direct Interactive on digital satellite TV would be prominently promoted as sources of information, to help manage the potentially high demand.

A single number automated action line is being considered for use in public information campaigns. Callers would be directed to NHS Direct (or regional variations) for advice, an information flyer ordering service for more information or a daily update supplied by Cabinet Office.

Aims of the communications plan

The primary aim of the communications plan is to convey accurate, timely and consistent advice to the public and health professionals and to aid understanding of the pandemic amongst the general population.

The secondary aim is to explain the ability of the NHS, DH and the Government as a whole to reduce the impact of a pandemic as far as possible but also to explain some of the constraints.

Public awareness and understanding of pandemic flu

Strategic research findings have shown that awareness and understanding of pandemic flu is very limited. The findings show that:

- 'flu' itself is generally not regarded as a serious illness (except by those within 'traditional' at risk groups)
- there is a confusion between antivirals and vaccine and their availability for treatment

- the distinction between 'bird flu' and pandemic flu is not understood. Bird flu is frequently confused with pandemic flu, meaning that communications on pandemic flu are open to misinterpretation. Pandemic flu can
  - be thought to already exist
  - be seen as a remote threat
  - be seen as irrelevant to the UK
- it is assumed that medical assistance to treat pandemic flu will be available. However as the difference between vaccines and anti-virals is not understood, this expectation does not lead to a specific demand
- there is virtually no recall of the launch of the Government's pandemic flu contingency plan. The information received from the media is perceived to be sporadic, inconsistent, and not associated with communications from Government (even when Government spokespeople are quoted).

Public information needs

Once the nature of a potential flu pandemic is explained, most of the public fully appreciate the need for public information on this topic. Furthermore, it was felt that communications during the inter-pandemic period have a clear role:

- if communications are delayed until the point of a pandemic emerging there is clear potential for public confusion and resentment will result
- during the inter-pandemic period there is the opportunity to build public understanding and establish the authority of a 'messenger' for communications on this topic, assisting the communications task at the point of any announcement.

Communications in the pre pandemic period should:

- outline what pandemic flu is and how it compares with ordinary flu
- stress the monitoring and planning work underway by the government and WHO
- highlight the difficulties associated with ensuring a vaccine is available with a vaccine – but emphasise work being done to develop one
- emphasise hygiene measures and the importance of infection control.

Health professionals broadly supported early communications. There were some natural concerns that this may lead the public to request information or reassurance from them, but the potential long-term benefits of this approach were appreciated.

It should be noted that, unless directly involved in planning for pandemic flu, health professionals have very mixed awareness of its potential impact, anti-viral treatment, and the current contingency plan. There is a clear need to build awareness amongst NHS staff to allow them to assist in delivering consistent information to the public.

Suggested information channels

Public communications which use the media to deliver information or announcements should not be overly relied upon in the inter-pandemic stage. There is little evidence that, to date, these have been understood as communications from government (rather than news 'stories'). Some form of paid-for media would be more appropriate, allowing on-going communications to build authority and understanding. However, during the inter-pandemic period a major campaign (using TV advertising) was not felt to be appropriate.

Strategic research

Strategic research amongst the public and health professionals was completed in May 2005. The findings are being used to help in the development of the pandemic communications campaign.

Specifically, the research aimed to:

- Identify the likely information needs of the public during a pandemic.
- What specific questions are likely to arise
- What governmental activity would be anticipated
- Any particular points where reassurance or guidance is required
- Who would be expected to lead in providing this information
- Whether medical, governmental or political authorities should lead
- How would the information be accessed
- Whether specific helplines would be anticipated
- Whether leaflets/information would be sought out or should they be delivered

Accessibility of information

All mainstream information and campaign materials will be accessible to the widest possible audience. The pandemic flu leaflet (Pandemic flu, important information for you and your family) will be produced in the following formats:

Online line printed information

All printed information will be available online in both PDF and HTML text versions

Large print

The leaflet will also be produced in larger type size and as a word/text document in any size requested

Easy read

For use by people with learning disabilities. This will also help people whose first language isn't English or with literacy problems.

Braille

Braille files will be prepared

Audio versions

For use by people with visual impairment, literacy problems, learning difficulties and people who understand English but it isn't their first language.

Textphone

There will be a textphone (Minicom) facility for ordering information materials.

British Sign Language (BSL)

A signed version of the public information film with subtitling will be made available

Ethnic minority audiences

The information leaflet will be available in electronic format in 20 languages.

Research will be carried out to assist in the development of appropriate messages and channels to reach ethnic minority communities.

Information on Interactive digital TV

NHS Direct Interactive is now available to around 7 and a half million homes with digital satellite television. During 2005, the aim is to roll the service out across the digital cable and Freeview platforms, extending access to up to 14 million homes.

New information can be published on NHS Direct Interactive within a few hours, once the content has been produced. It is suggested that basic information could be prepared in advance and stored in the content management system in readiness for publishing should the need arise.

There would be the opportunity for broadcasters to create 'red button' links from linear TV programmes on digital TV e.g. news programmes, to the NHS Direct Interactive service, for more advice and information.

Devolved Administrations

The Welsh Assembly

The Welsh Assembly Government, through its Office of Chief Medical Officer

and Health and Social Care Department, will liaise with the Department of Health to co-ordinate the provision of health information to all audiences. Where possible this will be done in parallel with the communications arrangements supporting the UK Departments' Plan and through the Assembly's Communications Team. The Communications team has responsibility in Wales for issuing information to the public and media, organising interviews and statements, collaborating with press offices of other agencies and linking to the local media and the Government News Network (GNN).

Actions throughout WHO pandemic phases

INTERPANDEMIC PERIOD

WHO Phase 1: No new influenza virus subtypes have been detected in humans. An influenza virus subtype that has caused human infection may be present in animals. If present in animals, the risk of human infection or disease is considered to be low.

WHO Phase 2: No new influenza virus subtypes have been detected in humans. However, a circulating animal influenza virus subtype poses a risk of human disease.

On the 1st March 2005 the government published the UK Health Departments' Influenza Pandemic Contingency Plan (**www.dh.gov.uk/pandemicflu**). It was supported by a press briefing chaired by the DH Secretary of State, John Reid and a presentation given by the Chief Medical Officer, Sir Liam Donaldson.

Messages

The following key messages supported the publication of the plan.

- Pandemic flu is different from 'normal' seasonal UK flu in important ways, which are…
- We do not know specifically when a pandemic of flu outbreak will happen. There are signs that suggest an outbreak could happen soon.
- The plan forms an integral and on-going part of the Department's work to protect the public from infectious diseases. Being prepared is part of the Department's mandate.
- This is a key part of the Department's preparations to deal with infectious diseases. These are prudent precautions for a modern society.
- There is likely to be very little warning of a pandemic of flu. Global tourism and air travel can accelerate international spread should this occur. This is why it is essential to be ready to respond before the pandemic begins.
- Pandemic flu vaccine cannot be available at the start of a pandemic flu outbreak. A specific vaccine can only be developed once a pandemic strain has been identified. This ensures that the vaccine matches the

pandemic strain as closely as possible. This may take a minimum of six months because each flu strain is different and will need to be developed and tested.

- 'Normal' flu vaccine will not protect against pandemic flu but people should still have their ordinary flu jab as normal
- Antiviral drugs can help treat those who have become infected with pandemic flu. Antivirals are currently being stockpiled. The initial stocks will be used for priority groups. It will take time for manufacturers to make sufficient stocks for us to build up our stockpile. As the availability of the drugs increases, treatment will be rolled out to the general population who need them.
- The Government's detailed contingency plans for responding to a flu pandemic are being shared with all health workers and NHS staff so they will know what to do if a pandemic occurs.
- Information and advice for the public on how best to protect themselves and their families will be made widely available through information leaflets, websites and the media. Such advice will include when, where and how to seek medical assistance.

The following information on pandemic flu has already been produced:

DH website

Pandemic flu has a section on the DH website at **www.dh.gov.uk/pandemicflu** which includes viewable and downloadable versions of existing outputs.

The contingency plan including the communications strategy (see above) was posted on the DH website for comment on the 1 March 2005. A link to the DH website can also be found on **www.ukresilience.info**

A microsite dedicated to pandemic flu issues is being developed on the DH website. This will carry links to other appropriate government departments such as transport and education.

CMO's guide Explaining pandemic flu

A detailed guide to pandemic flu, this document is posted on the DH website. Printed copies were given to journalists at the press briefing and sent to selected health professionals

Pandemic flu key fact sheet

This key facts sheet was also given to journalists at the launch and posted on the DH website.

Frequently asked questions

The FAQ was finalised in May 2005 and posted on the DH website

Q&A and key messages

A Q&A and key messages sheet have been prepared for use by key spokespeople, DH Media Centre, Regional Public Health communications leads, NHS Direct and others who will need to speak with the media

Information leaflet *Pandemic flu, important information for you and your family*

A leaflet for the general public has been produced and to date has been confined to posting on the DH website.

This leaflet was pre-tested amongst the general public including possible at-risk groups.

PANDEMIC ALERT PERIOD

WHO Phase 3: Human infection(s) with a new subtype, but no human-to-human spread, or at most rare instances of spread to a close contact

The following outputs are being produced and actioned

Training

A powerpoint presentation and an information training pack for NHS frontline staff is currently being developed. The pack will include factsheets, key messages, infection control advice as well as information on antivirals. A 'toolkit' for NHS communicators will also be available.

Public information materials

An information pack containing an updated CMO's guide Explaining pandemic flu, the leaflet Pandemic flu, important information for you and your family, key facts sheet, quick guide to vaccines and treatments, surgery poster and a covering CMO letter is planned for distribution in October 2005 to primary care, pharmacists, hospital infectious control consultants and NHS Direct call and walk-in centres

PANDEMIC ALERT PERIOD

WHO Phase 4: Small cluster(s) with limited human-to-human transmission but spread is highly localised, suggesting that the virus is not well adapted to humans

WHO Phase 5: Larger cluster(s) but human-to-human spread still localised, suggesting that the virus is becoming increasingly better adapted to humans, but may not yet be fully transmissible (substantial pandemic risk)

The following outputs are being produced and will be actioned at WHO phase 4/5

Public information film

A public information film will be produced and marketed to the BBC and ITV contractors for free to air broadcasting

National door drop

This will be a flyer giving key facts and practical self-help advice. It will be distributed to all households in the event of WHO raising the alert level to phase 5 and posted on the DH website. Distribution has been discussed in principle with Royal Mail.

The flyer will also be distributed to GP surgeries, NHS Direct, Walk-in centres, pharmacies and Health Promotion Units as well as being posted on the DH website. These could be printed and distributed in 14 days subject to method agreed with Royal Mail and posted on the DH website now

Advertising campaign

A public information advertising campaign has been tested and will be made and held in readiness and run in the event of WHO raising the alert level to phase 5. The role of this advertising will be to alert the public that pandemic flu is almost certain to arrive in the UK imminently and to look out for the information flyer being distributed to all households

PANDEMIC PERIOD

WHO Phase 6: Pandemic increased and sustained transmission in general population

The following outputs will be produced and actioned at WHO phase 6

Video news release (VNR) to camera.

This would probably be the CMO talking to camera. Given the subject matter and national importance, it is anticipated that it will attract considerable airtime. Could be produced in 48hrs.

Advertising campaign

TV

To run on a longer term basis after airing of the VNR. The film could be on air within a few days if it has already been made

National press

Outlining the key facts and giving further sources of information. National press could be bought the next day if mono only and copy was available by 5pm the day before.

Regional press

To be used in support of national press and to upweight areas where national press cover is weakest and where prevalence of pandemic flu is high.

Regional daily press could be bought the next day if mono only and copy was available by 5pm the day before.

Local radio

Outlining the key facts and giving further sources of information. From agreement of scripts and recording, ads could be on air within 2 working days

Travel advice

Posters and leaflets offering advice to travellers on pandemic flu (symptoms, self protect advice etc) have been prepared and will be displayed at sea, rail and airports in the event of WHO confirming the onset of pandemic flu. Advice will also be available for British nationals abroad. This would be actioned immediately the WHO alert level was raised to 6.

News Co-ordination Centre (NCC) activated to circulate cross-Government top lines briefing.

Treatment advice leaflet

A leaflet offering treatment advice to those who think they have caught pandemic flu will be made available to health professionals and the public through primary care.

Antivirals leaflet

A leaflet explaining how to use antiviral drugs will be made available to health professionals and the public through primary care

Vaccination leaflet

A leaflet to be produced on any vaccinations available and made available to health professionals.

Teletext page

Containing key facts and where to obtain more information. From approval of text 24 hours

CASCADING INFORMATION

Over-arching actions

- Pandemic declared by WHO.
- DH will alert CCS, Cabinet Office, Devolved administrations and HPA. Cabinet Office will alert OGDs.
- DH will provide updated threat assessment to Cabinet Office.
- DH alerts NHS organisations via CMO Public Health Link. Message would ask organisations to activate their contingency plans. It would also give clinical information for health professionals and would give relevant weblinks [draft text to be provided]. Further information contained in communications strategy attached.

- DH will work with FCO to issue appropriate travel advice and with DfT to reinforce messages to travel industry about preventing passengers from travelling whilst ill
- NCC top lines briefing continues to be updated and circulated cross-Government .
- HPA will activate its Emergency Preparedness plans.

Command And Control Structure In Support Of Who Phase 6

Central Co-ordination

- Cabinet Office to convene COBR
- News Co-ordination Centre activity stepped up in support of Lead Government Department, co-ordinating public and media information.
- DH to convene meeting of UKNIPC, which will consider available evidence and provide advice.
- Daily briefs prepared for Ministers
- Activate emergency operations room with representatives from Health Protection, Emergency Preparedness and HPA

Communicating with the NHS

It will be important for information to be cascaded in a coordinated and timely fashion between service providers in order to reduce the potential for confusion. Effective communication coordination can help to reduce local burden and minimise public anxiety.

To ensure communication channels and mechanisms are in place, tested to function and agreed with local stakeholders, SHAs must ensure:-

1. Communication roles and responsibilities between service providers are agreed
2. Internal and external communication channels are tested and functioning. Secondary back-up measures must be in place in the event of primary information mechanisms failing.
3. Communication plans including identified spokespeople are in place

4. Key messages are prepared and ready for deployment

Defining communication roles and responsibilities

SHA

28 strategic health authorities in England are responsible for oversight and management of primary care trusts. During the pandemic, SHAs will be responsible for ensuring local contingency plans are in place. They will act as the link between the DH and NHS and manage local NHS services. DH will cascade information to Chief Executives. The SHA must ensure

- Messages are rapidly cascaded to health and social care services
- Messages to service providers and professionals are clearly marked for intended recipients
- Messages to the public, provides critical advice and information. Early sign-posting where additional information can be obtained can help to manage the predicted increased burden on services

What are the communication plans for your area and who is responsible for communicating what?

Lead Primary Care Trusts

As part of emergency planning and response, lead primary care trusts in England are responsible for the delivery and implementation of joint health service provision.

During the pandemic, the lead PCT will act on behalf of linked PCTs including liaison with Police and Local Authorities. There is a potential for public misunderstanding about the role of various service providers. The lead PCT must clearly distinguish its messages when acting as lead PCT versus PCT for its own responsible population.

Local media relations will be important and necessary part of communication to the public. There should be a local media handling plan including briefing for journalists.

Lead PCTs when acting on behalf of the linked PCT should clarify its role in this area.

Primary Care Trusts (PCTs)

303 primary care trusts in England are responsible for initiating and supporting the response within their locality and in support of the lead PCT.

During the pandemic, PCTs will mobilise community resources including primary care and support Trusts in early discharges and management.

PCTs should ensure service providers in the local area understand the explicit arrangements in place between the SHA and linked PCT and how it will function.

PCTs should support primary care services and with local advice and information particularly outside normal surgery hours.

HPA local and regional services (LaRS)

LaRS will have an important role to play in terms of communicating with primary care and acute trust service providers.

Clearly defined and distinguished roles and responsibilities between Lead PCTs, linked PCTs, SHA and the HPA is needed. This is important as the level of public anxiety will depend in part on consistent and where possible non-speculative messages. Local coordination and control measures will need to be communicated quickly and clearly.

Local epidemiological information will be of interest to a wide range of stakeholders including health professionals and local media. A media handling strategy will be needed when communicating complex epidemiological/surveillance data.

MEDIA HANDLING

It will be vital to reassure a worried population that robust plans are already in place to cope with an epidemic or pandemic of flu (or other infectious diseases). That is why extensive explanatory media activity will have been undertaken in the inter-pandemic period, starting with the launch of the plan. The pre-prepared brief, Q&A's, and key messages updated as necessary, would be used by DH media centre. This brief would ensure consistency of the messages to be disseminated across government and through SHA and Regional Public Health communications leads.

The media – regional/national newspapers, radio, rolling TV news bulletins – will be a crucial mechanism for ensuring our key messages reach the full range of audiences. Key spokespeople previously identified, will ensure that accurate information is communicated through briefings, statements and interviews. Through the media, people can be referred to the CMO explanatory guide. Regional spokespeople will cover the widest possible network of media.

In the event of pandemic influenza in the UK, the media would be the primary communication channel for the public, who would also be directed to other sources for more detailed information, e.g. NHS Direct, Ceefax/Teletext and websites

KEY MESSAGES

These key messages deal with the onset of pandemic flu and the risks, and public information messages on protection and information.

Section 1: Information about onset of pandemic and risk

Risk has increased

The WHO has advised that the risk of a flu pandemic has increased. Once a flu pandemic affects other countries it will almost certainly reach the UK.

What is pandemic flu?

This occurs when a new highly infectious and dangerous strain of the influenza virus spreads rapidly round the world. Pandemic flu is different to normal flu – the jab for normal flu will therefore not protect you from pandemic flu.

Keeping you informed

The very nature of pandemic flu is such that as the disease progresses we learn more about it and how to manage it. The Department of Health will work closely with the media to ensure the public are kept informed of developments.

Health services

The Department of Health has plans in place to deal with a flu pandemic in the UK. The plan is intended to reduce illness, save lives, maintain services and reduce overall disruption to society. This plan has been acclaimed as being an example of good practice in preparation for a flu pandemic.

The NHS has measures in place to manage increased demand on services.

Spread of the pandemic

Everyone is susceptible although only a quarter of the population are expected to develop clinical illness. Another 25% could become infected without getting symptoms. Everyone will be at risk of infection though some will be more at risk than others.

Those most at risk could include the very young, people over 65 years of age, those with existing medical conditions such as lung disease, diabetes, cancer or kidney or heart problems and those who are immunosuppressed (such as those with HIV/AIDS). Those returning from the infected areas are more at risk of infection as they may have been exposed to the virus overseas.

Section 2: Public info re protection and information

Signs and symptoms

The virus is highly infectious and easily passed between people by breathing air containing the virus produced when an infected person talks, sneezes or coughs. It can spread through hand/face contact after touching an infected person or surface contaminated with the virus. The virus will develop in a few days (between 2-3) after infection.

Symptoms are similar to those of "ordinary flu" but generally more severe. These may include sudden onset of fever, headache, severe weakness and fatigue, aching muscles and joints and respiratory symptoms such as cough, sore throat, runny nose. Complications could include bronchitis, pneumonia or possible death.

Preventative measures

There are ways you can reduce the risk of becoming infected. These include:

– handwashing (especially after you have been outside) – to prevent acquiring the virus from contact with infected people or contaminated surfaces

– Respiratory hygiene: cover your mouth when coughing or sneezing to limit the spread of the virus

– After blowing your nose ensure tissues are placed in the rubbish

– Avoid crowds and large gatherings where possible

Other measures to control the spread of flu will include special surveillance and diagnosis of the virus and its spread and possible restrictions mass gathers.

Think you are infected?

If you think you or a member of your family may be infected by the virus:

– stay at home

– visit www.nhsdirect.nhs.uk

– go to NHS Direct Interactive on digital satellite TV

– or call NHS Direct on 0845 4647

Further information is available from the Department of Health website at **www.dh.gov.uk/pandemicflu**

ANNEX J

INFORMATION FOR OTHER ORGANISATIONS

Interim advice on the risks of an influenza pandemic

Purpose

This note is to inform emergency and business continuity planning by local authorities, schools and other education establishments, essential services and the business sector for the contingency of a world-wide pandemic of influenza. It highlights key issues to take into account in such planning. Further details are available in the main body of the UK Health Departments' Influenza Pandemic Plan.

Context

The main source of information for this guidance is the UK Health Departments' Influenza Pandemic Plan. It also draws on the results from consultation during 2004 by the World Health Organisation on preparedness for an influenza pandemic, which was largely driven by concerns amongst public health experts that the current outbreaks of avian influenza in parts of Asia could give rise to a pandemic[1].

The Pandemic Plan highlights, among other things, that Health Departments would implement a public education campaign, early on in a pandemic, on the nature of the infection and the measures the public and organisations can take to reduce its spread. Information would be widely available on Health Departments' websites and in leaflet form. However, a key message to the public would be that the ability of health services to reduce the impacts of a flu pandemic on health are limited, and as a result, infection is likely to be widespread.

This guidance is issued to local responders to provide advice on the likely impacts of an influenza pandemic in order to inform and assist emergency and business continuity planning. The guidance is not intended either to be prescriptive or to be an operations manual, nor does it place any obligations on local authorities or service providers. The guidance is intended to help establish a co-ordinated national framework for effective local contingency planning. The guidance is interim because thinking and planning continue to evolve.

Background

Influenza pandemics have occurred at irregular intervals throughout history, three in the last century: in 1918 ('Spanish flu'), 1957 ('Asian' flu) and 1968 ('Hong Kong' flu). Each of these events was associated with

[1] WHO consultation on priority public health interventions before and during an influenza pandemic http://www.who.int/csr/disease/avian_influenza/consultation/en/

illness, deaths and general societal disruption far in excess of that experienced in a 'normal' winter. The 1918/19 pandemic, for instance, is estimated to have caused over 20 million deaths world-wide with 150,000 deaths in the UK. A further pandemic is thought to be inevitable. There may not be much warning and therefore advanced planning is essential for a smooth response.

Nature and scale of a flu pandemic

The **outbreaks** or **epidemics** of influenza which occur most winters affect some 5 to 10% of the population. The vast majority will have an unpleasant but self-limiting illness or even no symptoms, with less than 0.05% consulting their GP. Those most at risk of serious illness or death (the elderly, and those with chronic underlying diseases) are offered annual vaccination. Death from flu is usually due to complications such as secondary bacterial infections, e.g. pneumonia, or exacerbation of an underlying disease, rather than the direct effects of the influenza virus itself.

An influenza **pandemic** arises when an entirely new strain of influenza virus emerges to which most people are susceptible. Thus it is able to spread widely. Some important features of influenza pandemics are:

- they are unpredictable
- they may occur at any time of year
- they are most likely to start in Asia, or at least outside the UK, and gradually spread; this spread has been divided into phases allowing an escalating response according to the scale and geographic spread of the pandemic
- spread to the UK may take several months, but may be shorter
- once established in the UK, the disease is likely to spread rapidly over 2-3 weeks and then gradually decline over the next 4-6 weeks; a second wave of illness may occur 6-9 months later
- some 20 to 30% of the population or even more may be affected over a 1-2 year period, including children and normally fit young adults, and
- a far greater proportion of people are likely to require hospitalisation or die than for seasonal flu.

Confirming a Flu Pandemic

The World Health Organisation (WHO) monitors influenza across the world. Once a new influenza virus has been identified and shown to have pandemic potential, the WHO will announce the various phases of a pandemic and inform national Governments (further details in Chapter 3 of main Plan). The UK Government will then put its own plans into action with the Department of Health in the lead working closely with the Health Departments in the Devolved Administrations (DAs) and supported by the Health Protection Agency and its equivalents in the DAs. This will include guidance and advice from Health Departments and/or the Health Protection Agency for the public and for planners across all sectors.

Department of Health influenza pandemic planning assumptions

Based on previous pandemics and current internationally agreed arrangements co-ordinated by the WHO, UK Health Departments have agreed the following planning assumptions (further details in Chapter 4 of main Plan):

(i) spread from the source country to the UK will take no more than one to two months. Following arrival in the UK it will take a further 2-3 weeks until cases are occurring across the whole country. Our aims are to slow its spread, at least in the short term, in order to buy time and spread the load on health and other services, and to reduce its impact.

(ii) most people will be susceptible to the new virus, although not all will necessarily develop clinical illness. All ages will be affected, but children and otherwise fit adults could be at relatively greater risk should elderly people have some residual immunity from exposure to a similar virus earlier in their lifetime.

(iii) influenza is mainly spread by the respiratory route, through droplets of infected respiratory secretions produced when an infected person talks, coughs or sneezes; it may also be spread by hand/face contact after touching a person or surface contaminated with infectious respiratory droplets. Finer respiratory aerosols (which stay in the air for longer and are therefore more effective at spreading infection) may occur in some circumstances.

(iv) vaccine will not be available in the early stages. A pandemic vaccine cannot be stockpiled in advance: it must be produced specifically for the virus concerned so development cannot start until the virus is

known. Everything will be done to produce a vaccine as quickly as possible, but it is likely to take at least 6 months.

(v) as vaccine becomes available it will be given according to nationally agreed priorities, starting with health care and other essential workers. Beyond that, the final decisions will be based on early information about the age groups being affected most severely. When vaccine supplies become more widely available, vaccination will be offered to the general population.

(vi) antiviral drugs are available for treating influenza, but even with a national stockpile, there will not be an unlimited supply. They may be used initially to try to contain small outbreaks. Later they will be used to treat certain narrowly-defined priority groups according to agreed guidelines in order to achieve the maximum health benefits.

(vii) planning should be based on a cumulative total of 25% of workers taking some time off – possibly 5-8 working days – over a period of 3 months. This first wave is likely to be followed by a second wave of similar duration. The interval between each wave could be several weeks or months. Absenteeism may be more than this either due to a higher rate of illness, the need to care for sick family members or fear of exposure to infection. Past pandemic experience indicates that between 10-35% of the workforce may be absent from work. The absentee rate is expected to peak for 1-2 weeks at the height of the outbreak (around weeks 8 to 9).

(viii) total deaths in the UK normally run at around 12,000 per week. During a pandemic, without effective interventions, total deaths are likely to gradually rise to 50% higher than normal at the peak of a pandemic wave, and then gradually decline. However, there is the potential for as many deaths in 12 weeks of a pandemic as in the rest of the year (around 600,000 excess deaths across the UK).

(ix) slowing down the spread and reducing the number that will be affected early in the first wave may be achieved by implementation of:

- robust public health advice [eg, stay at home if ill, or think you may be ill; wash hands frequently (particularly after contact with people who are ill, cover mouth and nose with a tissue while sneezing or coughing); avoid unnecessary travel; avoid crowds where possible.]
- treatment of those who are ill (with antiviral drugs within 24 to 48 hours of onset of symptoms)

- the use of face masks by medical staff in contact with infected people (to reduce droplet spread)
- travel advisories seeking to reduce international travel to or from affected areas

In addition, the following measures may be considered as public health interventions during a pandemic. Decisions on their implementation would be made once the nature of the pandemic virus and its effects were understood, and on the basis of scientific advice on potential benefits and on potential social and economic disbenefits. Response measures would be proportionate, particularly where social restrictions might be imposed:

- voluntary home isolation of cases
- voluntary quarantine of contacts of known cases (with potential impacts on work teams if all contacts of a case in a work team are asked to remain in voluntary quarantine; staff rostering would be needed to minimise business impacts in these circumstances)
- additional measures at UK ports, such as strengthening current port health arrangements
- robust additional public health advice to reduce non-essential travel and social/leisure gatherings
- advice on school closures (recognising the impact this will have on maintaining the workforce in other sectors).

These measures are being kept under review as public health interventions during a pandemic, and clear guidance will be issued by Health Departments, based on the advice of the UK National Influenza Pandemic Committee or guidance from the WHO or real time modelling as the evidence evolves or as need arises.

Some of these measures may be required as a result of staff absence or the general disruption, or may occur by default because of public concern or other considerations, such as concerns about possible exposure to infection when using public transport. Voluntary co-operation with recommended measures would be sought. Mandatory quarantine and curfews are generally not considered necessary and are not currently covered by public health legislation.

General advice to local authorities, educational establishments and businesses

For the purposes of business continuity planning, local authorities, educational establishments and businesses will wish to consider the likely effects of a pandemic on their organisations outlined above and the measures that may need to be taken to manage these. For example, by:

- considering the likely impact on their organisations and businesses
- considering their needs to maintain continuity of core business activities and putting appropriate plans in place taking into account high levels of staff absences
- providing information to staff and students (this will be available on the Department of Health website and in printed form).

Decisions on additional measures, such as postponing events will normally remain for local determination, based on advice and recommendations issued by Health Departments.

Particular advice to educational establishments

The pandemic virus may spread readily in schools and other education establishments (attack rates of up to 90% were reported in some boarding schools in previous pandemics). If this is confirmed as a characteristic of the virus, Health Departments will inform Education Departments to advise local education authorities and the education sector about measures to be taken to slow down spread of the virus. This advice would particularly apply to younger children, childcare settings and education establishments and may include closing down for a short period, and management of pupils/students travelling within, to and from the UK. Education Departments will assist in disseminating the advice to the various education sectors.

The decision on such closures will normally remain for local determination having regard for the possibility that such establishments may have insufficient staff and/or pupils/students to remain open and for the possible implications for increased work absence because of workers' child-care responsibilities.

For more information:

- visit www.nhsdirect.nhs.uk
- go to NHS Direct Interactive on digital satellite TV by pressing the interactive button on the remote control
- call NHS Direct on 0845 4647 (calls charged at local rates)
- visit www.dh.gov.uk/pandemicflu and www.immunisation.nhs.uk

Department of Health Publications
Phone 08701 555 455
E-mail dh@prolog.uk.com

This document is also available at www.dh.gov.uk/pandemicflu

October 2005